RAILROAD GAZETTE

FRIDAY, AUGUST 29, 1902.

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Contributions

Rebuilding the Baltimore & Ohio.

United States Engineer Office,
Buffalo, N. Y., Aug. 23, 1902.

To the Editor of The Railroad Gazette:

I was much interested in the article in the current number of the *Railroad Gazette* entitled "The Rebuilding of the Baltimore & Ohio Railroad," more so as I was at one time connected with the construction work between Connellsville and Confluence.

Referring to the low grade eastbound track, Confluence to Brook Tunnel, it may be of interest to your readers to know that this line was recommended for building instead of the present track by my father, Sigismund Low, but was overruled. EMILE LOW.

A "Movable Platform," or a Multiple Speed Railroad.

Pittsburgh, Aug. 22, 1902.

To the Editor of The Railroad Gazette:

I send you herewith an extract from the *Journal of the Franklin Institute* for 1838, which you may find worth publication. It is a review of a patent issued in 1838, and was written by Dr. Thomas P. Jones, who was at that time Secretary of the Franklin Institute, and who had previously been "Superintendent" of the United States Patent Office, a position corresponding, as I understand, to that of the present Commissioner of Patents. It was the habit of Dr. Jones to publish in the *Journal* short abstracts of patents as issued (which were then comparatively few in number), and to accompany them with a criticism which always evinced good mechanical knowledge and judgment, and often a sense of humor. I remember one instance in which, after indicating that the supposed invention possessed, as a matter of fact, no novelty, he added that it was an instance of "the pernicious practice of our ancestors of pirating our inventions."

The article which I send may be of interest, both as illustrating the extent of mental vagaries in the early days of railroading, and the character of the unfounded speculations which, even at the present time, are made the subject of Letters Patent. J. SNOWDEN BELL.

Patent No. 690, *dated April* 13, 1838.—*For an apparatus for obtaining a high degree of velocity on railroads; Jacob Nollner, City of Washington, April* 13, 1838.

This is one of those strange conceits which sometimes insinuate themselves into the minds of intelligent men, although it would be difficult for a looker on to find the avenue by which it could obtain an entrance; indeed, it might well be supposed that every avenue leading into such minds would be so well guarded by the watchful sentinel, good common sense, as effectually to repel such interlopers. The plan proposed is neither practical, nor practicable, nor did the inventor himself really think it so, but determined to place it upon record, under an impression that it might suggest, or lead to, something useful; "so mote it be."

Let a railroad be made, perfectly level and straight, and solid as the everlasting hills; let a car 20 miles long be placed on this, and be drawn by an adequate power; let another car, say of 10 miles in length, be placed on this first car, at its rear end, and let this also have an adequate independent motive power applied to it. Now let the two cars set off together at the rate of 20 miles an hour; the upper car will, in this case, travel over the ground at the rate of 40 miles an hour, 20 being due to the motion of the lower car, and 20 to its own motion. In the model at the Patent Office there are four or five of such cars, or movable railroads, *stratum superstructum*. The following is the claim:

"What I claim is the placing of two or more movable railroads, platforms, or articles capable of progressive motion, one above the other, so that each may be drawn along by an independent power applied to it, and, like itself, sustained upon the railroad, platform, mounted railway, or other article upon which it is to move; and this I claim, whatever form or arrangement the same may be made to assume, whilst the principle of action is the same with that herein exemplified."

Water Front Warehouses and Railroad for New York.

Chicago, August 18.

To the Editor of The Railroad Gazette:

I find in your issue of August 15 the republication of a letter of F. W. R. to the *Sun* concerning the suggested West street freight railroad.

F. W. R. is quite right in stating that, of itself, such a railroad would be less economical in its results than the present system of distributing railroad freight by water transportation. A belt railroad might, however, be useful as an adjunct to a system of marginal warehouses along the river front.

Permit me in this connection to recall an ancient suggestion of the committee of the American Society of Civil Engineers, which reported upon "Rapid Transit and Terminal Freight Facilities," Feb. 3, 1875. This committee, in Part II (the best and cheapest methods of delivering, storing and distributing goods and freight), called attention to the fact that, in its judgment, the width of 250 ft. then lately adopted for the widening of West street was needlessly great for the accommodation of the longitudinal traffic, and it proposed, among other things, that some 80 ft. thereof should be set apart for the erection of a series of warehouses, located on the bulkheads, in which goods held for eventual distribution or shipping might be stored, thus avoiding cartage, until their destination became known.

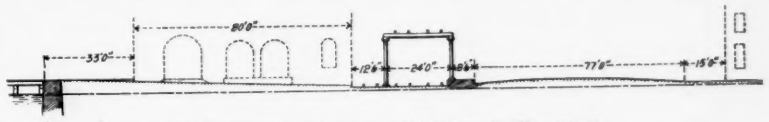
The committee estimated that the cartage bill of New York city was then (1875) some $12,000,000 to $15,000,000 a year, of which perhaps $3,000,000 to $5,000,000 per annum might be saved by locating marginal warehouses along the water front; that the land, if properly utilized, might be given a value of some $35,000,000, and that revenue thereon, if leased, might eventually accrue to the city.

The committee also suggested, although this formed no integral part of the plan, that this series of warehouses might be served by a double-tracked railroad and a series of side-tracks, *placed on the ground*, at an estimated cost of $40,000 a mile, while if placed overhead it would cost $300,000 a mile if built for a passenger road, or $500,000 a mile if built for a freight railroad. The surface railroad might be used to shift goods to other warehouses or to other piers, and would be chiefly operated at night, in the early morning, at noon, and in the early evening, but the work could also be done by water.

A cross section of West street, as it was then proposed to utilize it, is shown on the appended diagram. The elevated tracks shown were intended for passenger traffic, if this promised to pay, but might be modified to serve for freight traffic.

The experience which has been gathered since West street has been widened should indicate whether any part of the scheme is feasible, and whether it is best to serve a series of marginal warehouses by water, by a surface road, or by an elevated structure. The project has now been in oblivion 27 years, its features and details require careful consideration to conform to present circumstances, but I still believe that the fundamental idea of the warehouses next to the bulkhead is sound.

O. CHANUTE.



Water Front Warehouses and Railroad—New York.

American and English Railroad Rates.

The following letter was sent to the London *Times* on August 19 by Mr. Michael B. Wild, of the Baltimore & Ohio Railroad. It is in continuation of a discussion with Mr. George S. Gibb, General Manager of the North-Eastern Railway. For earlier letters the reader may see the *Railroad Gazette*, July 11, p. 557, and August 15, p. 643.

If Mr. Gibb intends his letter of 20th ultimo to be a reply to mine on the above subject, he has failed completely to deal with the points I raised. I hardly should have sought to invade your crowded columns had I had nothing more to produce than a modified confirmation of his figures, *qua* figures.

At this distance it takes so long to interchange letters that perhaps you will allow me to rehearse the main points of my argument.

What I said was that a comparison of rates unaccompanied by a comparison of values was not an indication of the real cost of railroad service in the two countries, and consequently that Mr. Gibb's bubble pricking had not been satisfactorily accomplished. I also stated that the only practical use of such a comparison could be in its bearing upon traffic destined to withstand the pressure of competition in foreign markets, and that as to this traffic Mr. Gibb's American rates did not apply. I then suggested that if Mr. Gibb were in earnest in his desire to overcome the disinclination of shippers to ship large quantities he could not do better than show them what they were losing by shipping in small quantities.

Now what is his answer to all this? Briefly, a statement of the total percentage of American over English rates, which amounts to nothing more than a repetition of his first statement; an assertion as to the comparableness of certain American districts with an English district, and a declination to adopt my suggestion.

If this be as far as Mr. Gibb is willing to go, I must say, in the expressive slang of America, that it looks as if his "bluff had been called," which, being interpreted for the unsophisticated folk of England, means that his attitude creates the suspicion that when he wrote you his first letter he "winked the other eye."

As, however, I don't wish the discussion to prove entirely fruitless, I should like to supply a few of Mr. Gibb's deficiencies, if you will grant me the space.

First of all, I am afraid we have to conclude that his comparison was between American less-than-carload and English carload rates, i.e., American maxima with English minima, for it is based on five-ton lots, and he admits that his minimum for carload rates is four tons, not a very surprising figure in view of the average capacity of English trucks and wagons. Therefore in the estimate of conditions necessary to be made to form conclusions on the comparison, he perforce disregarded himself and led others to disregard "the high cost of handling small consignments" to use his own perfectly correct language.

Let me proceed to give you American carload rates in comparison with English carload rates, as per Mr. Gibb for distance of 50 miles. They are as follows, viz.:

	English. s.	d.	American. s.	d.
Bricks	4	6	2	11
Cement	5	10	4	2
Flour in sacks	6	8	4	2
Malt in bags	7	1	4	2
Oil cake	6	8	4	2
Potatoes in bags	6	8	6	3
Plates and bars	5	0	5	0
Stone (rough building)	4	2	3	1½
Ale	10	0	6	3

Here we have a statement of English business as it is carried on in lots of five tons, and of American business as it is for the most part carried on; and inferentially at the back of this we have a very large proportion of English business ("most of our traders seem to prefer sending goods traffic in driblets") and a very small proportion of American business carried at higher rates than those in the table. This appears to me to be a condensed summary of the situation.

But in further confirmation of the low scale of American charges, I will venture to dip into official records and give the actual revenues per ton-mile realized by the Baltimore & Ohio Company on the staples mentioned for several months, comparing them with the revenues per ton-mile that would be realized on traffic carried at Mr. Gibb's American rates; and in order that we may see that the length of haul is very far from being as potent as the scale of charge in pulling down the rate per mile, I have added a comparison of average hauls. Here is the statement:

	Mr. Gibb's figures.		B. & O. actual figures.	
Staple.	Haul, miles.	Rate per ton-mile, cents.	Haul, miles.	Rate per ton mile, cents.
Bricks	50	5.84	124	0.604
Cement	50	4.04	...	.....
Flour	50	3.60	379	0.322
Malt	50	3.60	401	0.349
Oil cake	50	3.60	334	0.399
Potatoes	50	4.04	299	0.869*
Plates and bars	50	4.04	193	0.633
Stone	50	4.04	126	0.462
Ale	50	5.84	224	0.976†

*Includes receipts on fruit. †Includes receipts on wines and liquors.

Those who are sufficiently interested can work out for themselves the enormous disproportion between the increase in the haul and the decrease in the rate. Low as these American rates are, English shippers may rest assured that a good part of the export trade is carried at rates lower still.

It would be exceedingly presumptuous in me to think of suggesting what the course of English rates should be, especially in view of the enormous investment per mile the English roads represent, and I have not had an idea of doing anything of the sort, but I don't think it is looking facts in the face, and therefore I think it poor business policy to adduce a lot of rates that have no "rapport" whatever with English rates, because of different conditions and circumstances, as a reason for

not reducing English rates, if it be believed that the reduction would increase export business.

English manufacturing centers are on the whole much nearer the seaports than those in this country. Why is that an initial advantage such as this is largely thrown away? It is for the new spirit of inquiry now awakening, let us hope, in England to find this out and apply the remedy.

A word finally as to my own position in this matter. It may seem strange, indeed, almost traitorous, for such suggestions as this letter contains to be coming to you from this side of the Atlantic and this latitude. But why? The Empire takes about 66 per cent. of the Republic's exports, and it must surely be to our interest here to maintain your purchasing power. Should we be observing that interest if we allowed England to be lulled into a false security by misleading figures at this or any other time?

I fear you will think I have terribly abused your indulgence in writing you so long a letter, but the importance of the subject may justify your tolerance of me.

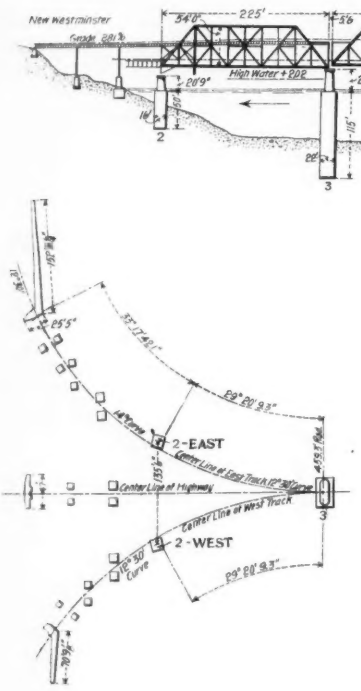
MICHAEL B. WILD.

Baltimore, August 19.

A New Bridge Over the Fraser River at New Westminster, British Columbia.

In our issue of August 15 appeared a note of a bridge to be built over the Fraser River at New Westminster, B. C. We are now in receipt of plans and specifications from the consulting engineers, Messrs. Waddell & Hedrick.

The bridge is being built by the Lands & Works Department of the Province of British Columbia. The contract for the superstructure has been let to the Dominion Bridge Company of Montreal, and for the substructure to Messrs. Armstrong, Morrison & Balfour, of Vancouver, B. C. The contract price for the entire structure is $750,000. The substructure must be completed by December, 1902, and the bridge should be open for traffic by May, 1903.



SUPERSTRUCTURE.

General Description.—On the New Westminster side, the bridge with crossoverhead, the track of the Canadian Pacific Railway, and on the other side the track of the Great Northern Railway. It will have two decks; an upper deck for wagon traffic and a lower deck for steam and electric railroad traffic. Directly over pier 3 the railroad track divides, turning to right and left on 12½ deg. curves. On this account, the shore span, while only 19 ft. wide between centers of pedestals over pier 3, is about 136 ft. wide over pier 2.

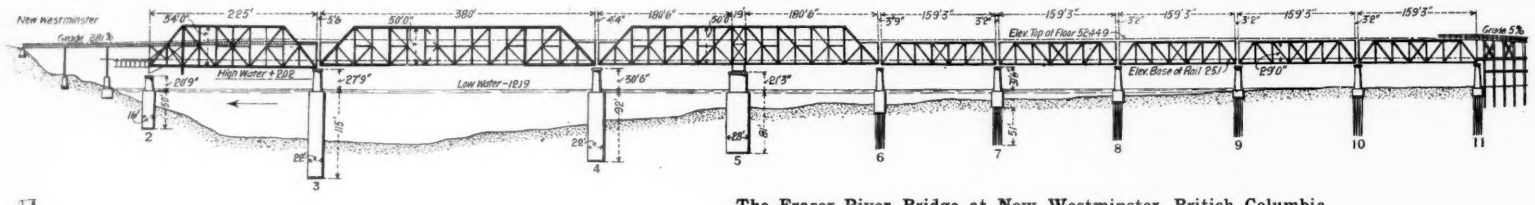
South of pier 2 there will be the following spans: One fixed span of 225 ft.; one fixed span of 380 ft.; one swing span of 380 ft., and five fixed spans of 159 ft. each, making a total of eight spans, 1,780 ft. long. There will also be a wooden trestle over the Great Northern track carrying separately highway and railroad tracks. North of pier 2 towards the New Westminster side there will be three distinct sections; the east wing, consisting of two plate girder skew spans of 75 ft. each, and two plate girder skew spans of 35 ft. and 68 ft. respectively; the west wing, consisting of four plate girder skew spans of 75 ft., 48 ft., 25½ ft., and 40 ft. respectively; and the highway structure consisting of plate girder spans.

The clear roadway for both railroad and highway will be 16 ft., thus making the distance between central planes of trusses 19 ft. for the 380 ft. spans, and 18 ft. for the 159 ft. spans. The five 159 ft. spans carry the highway above the top chords and the three longer spans carry it about mid-height of the trusses.

The design of the 225 ft. span between piers 2 and 3 is a little complicated owing to the divergence of the trusses. The vertical posts drop below the bottom chords in order to receive the ends of the cross girders. The latter are of varying depths, the bottoms lying in a plane inclined slightly to the horizontal. The longitudinal girders rivet into the cross girders, and the latter support steel bents that carry the highway girders overhead. The swing span will be operated by a 25 h.-p. gasoline engine. The interlocking apparatus will be in a little house on top of the 225 ft. span.

Amount of Material.—It is estimated by the engineers that a total of 6,854,000 lbs. of structural steel will be used together with 765,000 board feet of timber, and 15,000 lineal ft. of piles in the trestle approach.

Erection.—The five 159 ft. spans and the south arm of the swing span will be erected by means of falsework, but owing to the depth of water the north arm of the swing span will be erected by cantilevering. The engineers suggest, for the 225 ft. fixed span, two bents of falsework, thus erecting two long panels of the trusses, then cantilevering out one more panel and finally floating in one at a time the other portions of the trusses and coupling up during slack water. The 380 ft. fixed span is to be erected by providing toggles over piers 3 and 4 to attach to the spans already erected and cantilevering out to meet at mid span. The traveler will be supported by long timbers suspended to bottom chord pins by steel hangers. The engineers consider that the adoption of the above method ought to make the cost per pound for erecting the metal work less than that usually paid for the erection of large railroad bridges in the United States.



The Fraser River Bridge at New Westminster, British Columbia.

Specifications for Material.—All steel used in this structure will be acid or basic open hearth. The chemical specifications are:

	Per cent. Soft steel.	Medium steel.
Phosphorus (acid steel)	.05	.06
Phosphorus (basic steel)	.03	.04
Sulphur	.04	.05
Silicon	.04	.05
Manganese	.60	.70

The physical properties of the metal are given in the following tables:

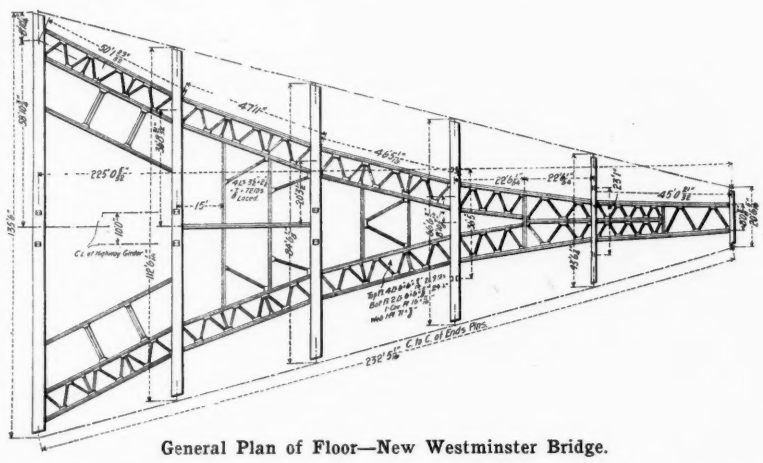
	Tensile strength, lbs. per sq. in.	Elastic limit, lbs. per sq. in.
Soft steel	50,000 to 60,000	30,000
Medium steel	60,000 to 70,000	35,000

	Percentage of elongation. Soft steel.	Medium steel.	Percentage of reduction in area. Soft steel.	Medium steel.
Rounds (excepting pins)	26	24	50	44
Pins	..	20	..	40
Angles and bars	26	24	48	40
Plates under 40 in. wide	..	24	..	40
Plates 40 in. to 70 in. wide and webs of beams and channels	..	23	..	38
Plates over 70 in. wide	..	21	..	37
Flanges of beams and channels	..	20	..	36

All steel castings are to be acid open hearth containing from .25 to .40 per cent. of carbon and not more than .05 per cent. of phosphorus, .05 per cent. of sulphur and .8 per cent. of manganese. The ultimate strength must be from 65,000 to 75,000 lbs. per sq. in., and the elastic limit not less than one-half of the ultimate strength.

All piles for the trestle work are to be of cedar. All other timber is to be Douglas fir.

Workmanship.—The specifications call for all punched work to be so accurately done that, after the component pieces are assembled and before reaming, 40 per cent. of the holes can be entered easily by a rod of a diameter 1/16 in. less than that of the punched hole; 80 per cent. by a rod ⅛ in. less, and 100 per cent. by a rod ¼ in. less. No sharp or unfilleted re-entrant corners will be allowed anywhere in the work. All rivets are to be machine driven except where absolutely impracticable to use the apparatus. All reaming is to be done by means of rigid twist drills. Punching will not be permitted in any piece in which the thickness of the metal exceeds the diameter of the cold rivet. The metal work is to be painted with Superior Graphite Paint made by the Detroit Manufacturing Co., Detroit, Mich.



General Plan of Floor—New Westminster Bridge.

SUBSTRUCTURE.

General Description.—Beginning at the New Westminster end of the bridge there will be three abutments, two of which will have long wing walls. Adjacent to the Canadian Pacific track there will be eight pedestals supporting the railroad tracks above. Four other pedestals will be required for the highway spans, two being at the water's edge and two north of the wagon road.

Piers 1 to 5 inclusive will be sunk by open dredging. Piers 6 to 11 inclusive will consist of concrete or first-class masonry shafts resting on timber cribs filled with piles and concrete. Borings made by the engineers show nothing but sand mixed with a little gravel at all points except that close to the New Westminster bank there is a mass of boulders.

Method of Construction.—It is thought that some difficulty may be experienced in sinking piers 1 and 2 on account of their large ratio of frictional surface to weight. Below the boulders excavation will take place from a central well. The cribs will be loaded and water jets will be used along the cutting edges and on the periphery. In sinking the caissons of piers 3, 4 and 5 the only difficulty that will probably be experienced is the holding of the caissons in place. The engineers suggest that a current breaker be placed above the site of each pier.

The current breaker suggested consists of a triangular box, having a water tight bottom and sides, with timber aprons running down stream. Pipes, with stop cocks, should lead into the box so that it can be filled quickly with water. There should also be a set of pipes for forcing jets of water along the exterior of the base. It is proposed to flood this box in place, the bottom of the box being close to the river bed, turn the water in so as to sink it quickly, turn on the jets and force it about 12 or 15 ft. into the sand. The box can be removed at any time by pumping out the water and removing some of the stones previously put in to help sink it.

Piers 6 to 11 inclusive will rest on long piles driven in by means of combined hammer and water jets. The length of these piles will vary from 60 to 75 ft.

Material.—The concrete for all piers, pedestals and abutments is to be mixed in the following proportions: One part of Portland cement; three parts of clean, coarse, sharp sand; and five parts of broken stone to pass a 2½ in. ring. The concrete for copings and upper surfaces is to consist of one part of Portland cement; two parts sand, and three parts broken stone to pass a ¾ in. ring.

All surfaces that are to be exposed to the air are to be covered with 1½ in. of Portland cement mortar consisting of one part of cement and two parts of sand. The method of constructing this outer shell is as follows:

Steel plates ¼ in. thick by 12 in. wide and from 4 to 5 ft. long are to be placed all around at a distance of 1½ in. from the forms, and are to be blocked out from the latter every 12 in. by small pieces of wood. Then the concrete is to be put into the box thus formed to a depth of 9 in. and thoroughly tamped. Meanwhile the mortar is to be placed between the steel plates and the wooden form, to a depth of 11 in. and tamped down, the wooden plugs being gradually withdrawn. Before the concrete or mortar have time to set, the steel plates are to be withdrawn by means of hooks inserted in holes placed near the upper edges; then the mortar is to be rammed again so as to fill the voids left by withdrawing the plates.

At this point on the Fraser River there are two daily tides with an average extreme variation of 4 ft. It is thought, however, that this variation is not sufficient to seriously affect the construction work.

Competition for the Foreign Locomotive Trade.

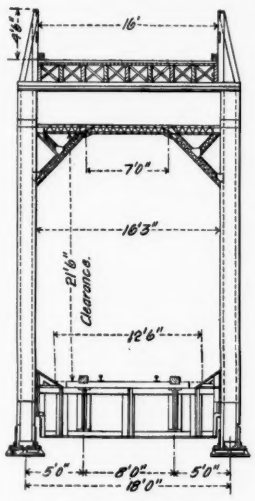
We have just received a document containing correspondence between the Secretary of State for India and certain British firms as to competition between German and British builders of locomotives. The case is so well stated on both sides and the subject is so interesting to many, and so very important to some, that we print below pretty liberal extracts from that correspondence.

Letter from the Under Secretary of State for India to Messrs. Dübs & Co., Glasgow, dated June 24, 1902. (A similar letter was sent to Messrs. Nasmyth, Wilson & Co.)

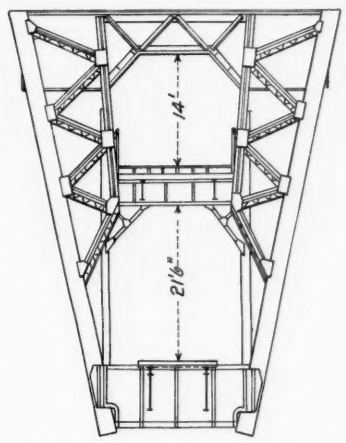
I am directed by the Secretary of State for India in Council to enclose formal acceptances of your tenders for locomotives, dated the 5th of May, 1902. . . . finally decided that he would await the result of these orders, which may be regarded in the light of an experiment, before entrusting to German manufacturers, for the first time, an important contract for locomotives for State railways. . . .

If it should be shown by experience that the German manufacturers are able and willing to turn out work which, though possibly inferior in respect of finish, is for practical purposes equal or nearly equal to that which is produced in this country, at prices materially lower, and with the further advantage of much earlier delivery, it is obvious that, in justice to the interests of India, he will be compelled to accept foreign tenders, and, possibly, to accept them on a large scale.

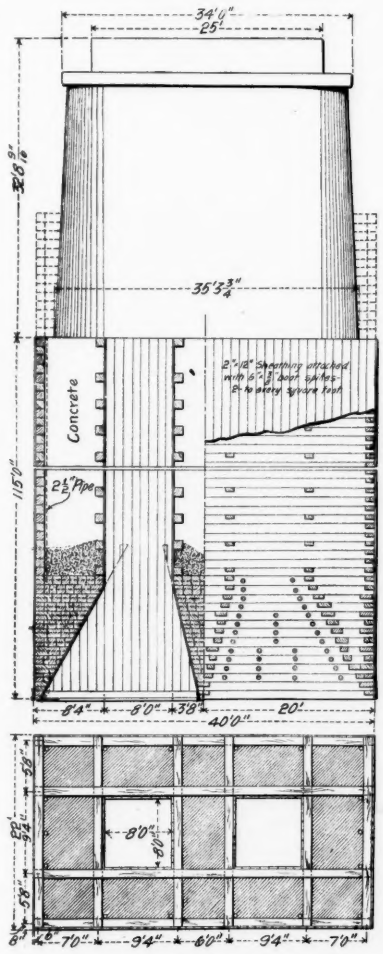
Indian railroads are now, generally speaking, in a prosperous condition; their business is increasing, and the construction of a large amount of new mileage is in hand or projected. These facts point to the possibility of increased orders for rolling stock and railroad plant of all kinds; and Lord George Hamilton trusts that the locomotive makers of this country may be able to make such arrangements as will ensure that they shall profit to the full by the opportunities which are likely to occur.



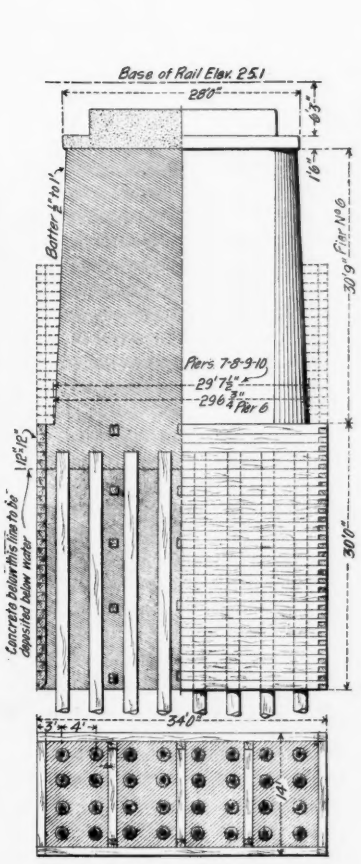
Section Through 159 Foot Span.



South End View of 225 Foot Spread Span.



Detail of Pier No. 3 and Crib.



Detail of Piers 6, 7, 8, 9 and 10.

Fraser River Bridge—New Westminster.

Letter from Messrs. Dübs & Co., Glasgow, to the Under Secretary of State for India, dated July 15, 1902.

. . . In respect of the reasons which induced in the mind of the Secretary of State the very serious doubt which he felt as to the decision at which he ought to arrive, our first and main contention is, that although in the late competitions British and German manufacturers tendered upon the same specification and drawings, they placed very different interpretations upon these documents, and naturally framed their estimates upon their interpretations. The competing British firms were perfectly familiar with both the letter and spirit of the specification, having supplied under its conditions practically all the locomotives in use on the Indian railroads. The competing German firms have not yet got so far as to deliver a single locomotive in India. The British firms estimated to use the very best material obtainable, and to put upon the locomotives a class of workmanship and finish which admittedly has not been reached by any foreign locomotive builders. The German firms estimated to use much cheaper materials, while their standards of workmanship and finish are much below those of their British competitors. The tenders were not fairly comparable; the British tenders were for one class of locomotive, very costly to make and, therefore, costly to buy; the German tenders were for another and a lower class of locomotive, cheap to make and, therefore, cheap to buy. Our works cost was very much higher, and while the German firm you refer to no doubt "distinctly understood" that everything was to be of the best, the facts that are known sufficiently prove that their best was relative to their own practice and not to ours.

For the same order he received, from a firm of German manufacturers of the highest standing, tenders which, in respect of the passenger engines required, were more than 20 per cent. below your prices, and, in respect of the goods engines, nearly 20 per cent. below your prices. The date of delivery was, in respect of the passenger engines, 25 weeks earlier, and, in respect of the goods engines, 13 weeks earlier than that which you named; and it was distinctly understood that none but the best materials should be used, that the specifications should be in every respect strictly complied with, and that the usual tests should be rigidly enforced.

His Lordship, in these circumstances, was unable, without much hesitation, to give the order to a British firm. But, as you are no doubt aware, orders for locomotives have recently been given to German firms by various Indian railroad companies, and his Lordship

We therefore, with all respect, demur to your proposition that the Indian Government will be compelled, in the interests of India, to accept foreign tenders for possibly inferior workmanship and finish if the prices are materially lower. The real question is, whether the interests of India are best served by working the railroads with the best locomotive engines it is possible to obtain (a system which through many years has produced the very best results), or by introducing, for the sake of a saving in first cost, locomotives of inferior material, workmanship and finish. That the first alternative ought to be adopted is, we submit, abundantly proved by what is publicly known of the working of the American engines supplied to the Burma Railway Company, and by what is less publicly known of the character of the tenders recently supplied to the East Indian Railway Company from Germany, as to which we would respectfully suggest that the Secretary of State might usefully call for the locomotive superintendent's report thereon. In view of future competitions, therefore, it becomes a matter of urgent importance that we should be informed whether the Indian Government and railroad companies propose to continue or to abandon the high standard of quality in materials, workmanship and finish to which we have hitherto worked. We take it that in their purchases of locomotives the broad aim of both Government and railroad companies is ultimate economy; that is, economy in their consumption of fuel, in their cost of maintenance, and in the work to be got out of them. The first cost of the engine is only one item in this calculation, and the experience gained after a year or two's working may very well prove that too much importance has been attached to it. That is undoubtedly the view of the Government Railway Authorities in Egypt, and we could desire no stronger testimony in favor of our case than is to be found in Lord Cromer's latest report. And to take only one further instance—the Chairman of the Leopoldina Railway of Brazil, in April last, was even more emphatic as to the ultimate economy to be effected through purchasing British-built locomotives, even though they should cost, to begin with, 25 per cent. more than American.

In the late competition the question of early delivery was given almost equal prominence with that of price. . . . The German firm undertook to complete the work in 46 weeks. About 41 of those weeks have now expired, and not one engine has yet been shipped, the delay having, we understand, been caused by the wholesale rejection of materials. . . .

From a feeling of Imperial duty, we encouraged many of our men in their desire to fight for their country in South Africa, keeping open the places of many, and supporting their families during their absence. Must we tell them on their return that owing to the action of the Indian Government and railroad companies, we have no work for them, or must we give them the almost equally hard message that the highly skilled workman is no longer in demand? Yet that would be the effect of transferring Indian orders to Germany, or of lowering the British standard of work to the German level.

Lastly, we would remind you that to facilitate the working of the Indian railroads we have been invited to draw up designs of standard engines for several varieties of duty, and the Secretary of State for India has indicated that, in his opinion, the British manufacturers should greatly enlarge their premises. Until the standards committee, which is now at work, has settled the initial details as to working, it has not been possible for us to make much progress with the standard designs. But we could hardly be expected to work upon them with any enthusiasm if, when finished, they were to be used against us by foreigners. We have already intimated that, given reasonable security, that we shall retain the Indian market, we are quite prepared to extend our premises so far as may be necessary to meet all the needs, present and prospective, of the Indian Government; but we cannot go far in this direction if the Indian Government and the Indian railway companies were to adopt the policy of buying engines from Germany or from America, "possibly inferior in respect of finish" and only "nearly equal to those produced in this country" simply because they are cheaper—to begin with.

Letter from Messrs. Neilson, Reid & Co., Glasgow, to Secretary of State for India, dated July 14, 1902.

. . . The policy of publicly advertising Indian locomotive contracts, while it may result in the submission of low offers, has also corresponding and, in our opinion, most serious defects and disadvantages from the *purchaser's* point of view, and particularly so when, as at present, tenders from American and Continental firms are not only entertained, but compared side by side. One of the obvious defects of the system of advertising for offers for locomotives is that any firm may tender to supply the work, no matter how deficient its workshops may be in organization and equipment, and although it may have had no previous knowledge or experience of the special requirements of the particular railroad.

Further, advertising tenders for locomotive contracts causes undue delay in settling contracts from the time the requisitions from India are received. . . .

Public tendering for locomotive contracts renders *standardization* or *duplication* an impossibility, as to secure cheapness the purchaser must be prepared if necessary to place his orders with a different firm on each occasion. . . . Thus we find that certain Indian railroad companies have been knocked about recently from "pillar to post" in the attempt to find a cheap and satisfactory source of supply. After trying with most unhappy results several American firms, further orders for locomotives for India have been placed in succession with the Hanover Locomotive Works, the Berlin Machinery Company, and last of all with Messrs. Borsig, of Berlin. . . .

We are not surprised to find a difference of 20 per cent. in the prices quoted by the Germans and the lowest of the British firms tendering in the case you refer to, and indeed we should have expected to see a much greater difference. We have a note of some of the prices quoted for an important contract for Indian locomotives settled in April of this year, and we find that there was a difference of over 28 per cent. between the price quoted

by the British firm that secured the order and another British firm of the highest standing.

There is no article which can be produced in such varying qualities as a locomotive, and there is ample room in its manufacture for large savings in the cost of production which would not be revealed immediately even when it was actually at work on the railroad.

If cheapness or specially early delivery is a "sine qua non," then there is surely an intermediate stage between the possibly over-inspected, expensively produced British-built locomotive with its material and workmanship specially specified, and the correspondingly inferior article as usually made in Germany or America. . . .

Your Lordship refers to possible further locomotive requirements for India, but, while these may be forthcoming, we have no assurance as to when they will be placed in the market, and we can only say that at the present moment we are in the, for us, unique position of not having a single inquiry, to the extent of even one locomotive, for any railroad in our great Indian Dependency. . . .

Letter from Messrs. Nasmyth, Wilson & Co., of Patricroft, near Manchester, to the Under Secretary of State for India, dated July 1, 1902.

. . . We very much appreciate the action of the Secretary of State in accepting our tender for locomotives, dated May 20, 1902, and fully realize the somewhat difficult, we might almost say delicate, position in which he was placed in the matter; for without documentary evidence that the British-made locomotive was not only superior in workmanship, fully equal to the difference in initial cost, but was also more economical in its consumption of oil, and especially fuel, in actual working, to the German, such as was adduced in the highly interesting "Correspondence Respecting the Comparative Merits of British, Belgian and American Locomotives in Egypt," between (principally) Lord Landsdowne, Lord Cromer, and Sir Alfred Hickman, M. P., and presented to both Houses of Parliament by command of His Majesty in March, 1902, it is, we admit, difficult in the face of it to ignore a difference in price of 25 per cent. We do not wish to burden you with detailed extracts from this report, but to show how a mere difference of actual first cost may prove relatively unimportant compared with the annual cost of working and fuel, we give one short extract from a letter from Lord Cromer to the Marquis of Lansdowne, dated Dec. 31, 1901, which we think is very significant. Lord Cromer, in treating the fuel question, says: "Trials were made with both goods and passenger engines. It was found (inclusive No. 1) that in the case of goods engines the American consumed 25.4 per cent. more coal than the British engines, while the latter was drawing 14.2 per cent. more load. In the case of the passenger engines, the American was 50 per cent. more than the British consumption, with the same average load. This latter difference represented, at 34s. 2d. per ton (the average price paid last year by the Railway Board), an additional cost of £400 per engine." From this you will see that as the cost of the British engine was £2,240, the actual saving in fuel alone each year was equal to 18 per cent. in the first cost of the engine. Even, therefore, supposing that the American engine had been 25 per cent. cheaper originally, this saving would have been an important set-off; but, as a matter of fact, the quoted price of the American engines made to the designs and specifications of the Egyptian Railway Board was £2,700, or £460 per engine more than the British, i.e., a difference roughly of 20 per cent. . . .

We are fully aware that these remarks apply to American versus British locomotives rather than German, of which at present we have few authentic results, but in the light of the experience gained with them in actual practice we think the Secretary of State has come to a very wise decision to await the results of the engines which have been ordered on such a wholesale scale by the various Indian railroad companies (other than the State lines), and we fully appreciate his action in deciding to do so rather than using the action of the private lines as a precedent for his own policy with regard to the State lines. We take to heart the warning contained in the last paragraph but one of your letter, but would venture to point out that the statement that "the German manufacturers are able and willing to turn out work which though possibly inferior in respect of finish, is for practical purposes equal or nearly equal to that which is produced in this country at prices materially lower," etc., contains more than meets the eye. As "finish" is itself a very costly addition to the cost of the engines, and as the words "nearly equal" with regard to workmanship may mean a great deal, we would ask that if a true and fair comparison is to be made, the conditions in respect of finish and workmanship should be *absolutely* equal. . . .

Circular Letter from the Under Secretary of State to Messrs. Dübs & Co., Messrs. Neilson, Reid & Co., and Messrs. Nasmyth, Wilson & Co., dated July 21, 1902.

His Lordship desires me to observe that as to the advantageous nature of the German tenders in respect of price, and of the promise of early delivery, there can be no question. On the other hand, he has certainly no wish to dispute the allegation that German work is inferior to British work in this particular line of manufacture; but this inferiority has not yet been proved by actual experience in India, still less has it been proved to be so great as to outweigh the very material advantage in point of cost, and of the prospect of speedy delivery, which would be gained by the acceptance of the foreign tender. It is true, he believes, that difficulties have arisen in connection with some of the railroad companies' contracts now pending; but, as you very truly point out, the German firms are at present unused to English standards and requirements, and it may be that when they become better acquainted with the tests imposed, both as regards material and workmanship, they may decline to continue to tender at their recent low price.

I am to repeat that his Lordship is most anxious to avoid the necessity for placing orders abroad, not only for the more obvious reasons to which you refer, but also for others, which render it less troublesome and more satisfactory in many ways to deal with British makers. But he cannot avoid the conclusion that, unless this difference in price and in the time required for the execution of orders, is fully compensated for by the superior quality and durability of the article supplied, the possibility of confining orders for Indian locomotives to this country will be seriously imperilled.

Letter from Messrs. Nasmyth, Wilson & Co., to the Under Secretary of State for India, dated July 22, 1902.

. . . We do not pretend, nor, we think, do any of the other British locomotive builders contend, that British manufacturers can expect to obtain 25 per cent. better prices than Continental, merely on the score of nationality, assuming that the quality of work and finish given by the Continental makers is, in all respects, equal to the British. Such an attitude on the part of the British builders would hardly be reasonable. Our contention was, and is, that, until the Continental work is indisputably proved to be as good or better than the British, to cast in our teeth the lower price and quicker delivery urged in support of the Continental makers, was hardly fair to us.

All that can be said at present with regard to the quality of the work is (we quote your own words), that "this inferiority has not yet been proved by actual experience in India." We do, however, know that a large amount of the work has been rejected in the course of construction in Germany, before the defects had been able to show themselves up in the actual working in India.

We are pleased that you appear to agree with us in our contention, that German firms are, at present, unused to English standards and requirements, and that very possibly, when they do become better acquainted with the tests imposed, they will decline to continue their recent low prices. We ourselves feel so sure of this that we are inclined to await that state of things, which we think is almost sure to come about, without misgiving; and, having complete confidence in their being fairly and frankly dealt with at the India Office, we think the British makers need not really fear the course adopted by the Indian Railway Companies proving such a success as to set a precedent for the State Railways. . . .

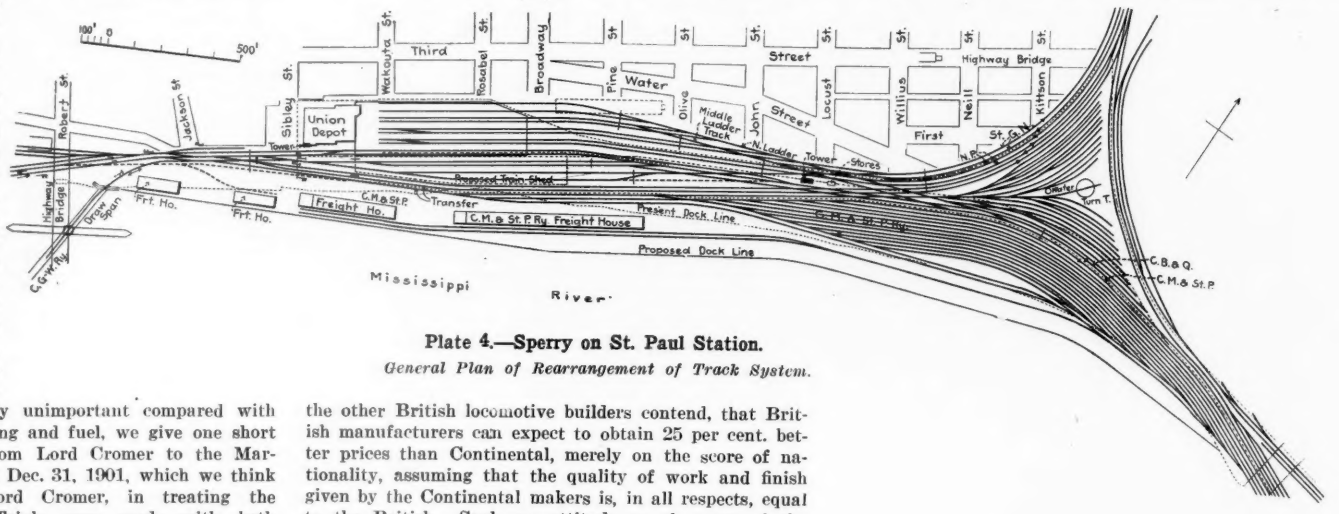


Plate 4.—Sperry on St. Paul Station.

General Plan of Rearrangement of Track System.

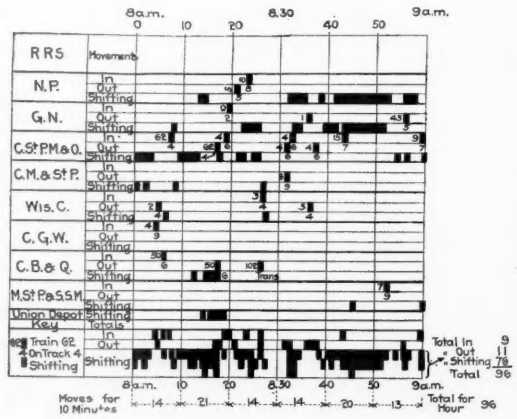


Plate 1.—Sperry on St. Paul Station.

NOTE.—*This diagram shows 90 movements in one hour. Compared with Grand Central Station, New York City, same hour: Grand Central Station, 21 tracks, 192 moves per hour, 2,363 per day; St. Paul Union Depot, 10 tracks, 96 moves per hour, 544 per day. Average moves per track, Grand Central, 9.1; average moves per track, Union Depot, 9.6. Traffic handled by interlocking at New York; by hand switches at St. Paul.*

Improvements at the St. Paul Union Depot.

A little more than a year ago Mr. Henry M. Sperry, of the Union Switch & Signal Company, submitted to the Union Depot Company of St. Paul a report, a copy of which has been in our hands for several months, and the work of carrying out his recommendations is well underway. We have printed heretofore some notes concerning this report, and now print an abstract, which will give a pretty good notion of its scope and nature. Obviously, this is not now printed as a matter of news, but for the much more important reason that it is an excellent example of this class of study. We regret that the want of space prevents printing the report in full, and also prevents reproduction of some of the drawings, which would perhaps make matter a little clearer. We have retained the original numbering of the plates, although we do not reproduce all of them. We ask particular attention to Plates 6 and 7, giving the method of analysis of the somewhat difficult problem of the occupation of tracks. Mr. Sperry's analysis is ingenious and adequate. What follows is from the report.

The present station has 10 tracks, nine covered by a train-shed, and the 10th, south of the shed, used for freight transfers. From Broadway, at the east end of the train-shed, to Willius street (1,400 ft.) the right-of-way is only wide enough for three tracks. Of these the north track is used for trains east over the Great Northern, and north of this is a track owned by the Great Northern, used for trains west over that road. The south track of the Union Depot Company is used for trains east, both passenger and freight, and the middle track for trains west. It will be seen, therefore, that the Union Depot Company has but three through tracks, of which two are used for both passenger and freight service, the fourth track being the property of the Great Northern Railway. These tracks are used by seven tenant lines, and connection with these tenant lines is had in five cases by single track.

On account of the narrow right-of-way from Broadway eastward, all tracks in the train-shed are very short, the longest being only 700 ft., and the coach yard, beginning at Willius street, is greatly cramped for space—tracks are so short that it frequently requires three or four of these short tracks to hold a train. This station is used both as a terminal and as a through station.

The passenger traffic time-table, March 3, 1901, which may be taken as a fair average for the year, shows a total of 202 trains arriving and departing daily. On account of the short length of tracks and other restrictions, 92 per cent. of these trains are handled on six tracks. The hour of heaviest traffic is between 8 and 9 a.m., the average number of movements being 9.6 per track, or 96 for the hour. This record is hard to equal, and it is doubtful if it is much exceeded by any station in this country or elsewhere. Plate 1 shows this movement.

If the passenger traffic alone had to be considered, the problem would be greatly simplified, but this station is unique in the use of one of its tracks for freight traffic.

From record taken April 16, 1901, 106 transfer movements were made in the 24 hours, consuming 6 hours and 10 minutes. The trains move slowly, are required to come to a full stop at Third street, and must flag at this point if off their schedule time. Delays on account of using this track in both directions, and the joint use of it by passenger trains, are unavoidable and serious. The capacity of the station is now taxed to the utmost during the busy hours, making it impossible to handle any additional trains without great delays.

There is another feature that adds to the difficulty of moving the passenger traffic, and that is the arrangement of the time-table. Schedule of March 3 shows six trains that are given the same time as six other trains that are required to move over the same main track, entering or leaving the station. This not only leads to confusion and makes it impossible to move on time, but is not a good practice, and is largely due to the fact that the Union Depot Company has little or no voice in the make-up of the time-table.

The acquisition of some property on the south has made it possible to add five passenger tracks and one transfer track, but more room is yet needed to provide a proper coach yard and drill track.

Separation of passenger traffic from freight traffic has been accomplished by providing a double-track exclusively for freight traffic south of the passenger tracks, with double-track connections at both termini.

It has been impossible to materially improve the conditions of the coach yard. A drill track running parallel

Mr. Sperry recommends air pressure to handle the switches rather than electric power, as in the event of a breakdown in the power house a couple of locomotives could be attached to the air main and their boilers furnish power to work it. Again, by using a working pressure of 80 lbs., the brakes of cars can be tested and pneumatic tools used without requiring a separate main.

Analysis of Occupation of Tracks.

To determine as far as possible that the plans as prepared will be adequate to handle the traffic, two dia-

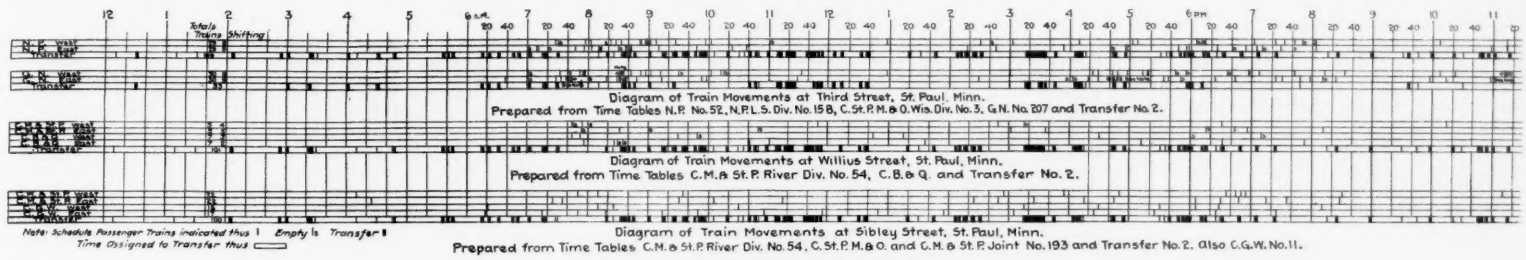


Diagram of Train Movements at Third Street, St. Paul, Minn.
Prepared from Time Tables N.P. No. 52, N.P.L.S. Div. No. 158, C.St.P.M.&O.Wis.Div. No. 3, G.N. No. 207 and Transfer No. 2.
Diagram of Train Movements at Willius Street, St. Paul, Minn.
Prepared from Time Tables C.M.&St.P. River Div. No. 54, C.B.&Q. and Transfer No. 2.
Diagram of Train Movements at Sibley Street, St. Paul, Minn.
Prepared from Time Tables C.M.&St.P. River Div. No. 54, C.St.P.M.&O. and C.M.&St.P. Joint No. 193 and Transfer No. 2. Also C.G.W. No. 11.
Note: Schedule Passenger Trains indicated thus | Empty is Transfer
Time Assigned to Transfer thus

Plate 6.—Sperry on St. Paul Station.

Summary Third Street — Trains Over Northern Pacific Line A.

	West.	East.
N. P.	6	6
N. P., Duluth	5	5
N. P., empty	3	4
W. C.	3	3
C. G. W.	5	5
M., St. P. & S. S. M.	5	5
M. & St. L.	5	5
Empty	5	5
Totals	37	38
Transfer	109	

Summary Third Street — Trains Over Great Northern Line.

	West.	East.
G. N.	9	9
G. N., empty	9	9
C., St. P., M. & O.	10	10
C., St. P., M. & O.*	8	8
W. C.	1	1
C., B. & Q.	2	2
Totals	39	39
Transfer	53	

*Not shown on G. N. time-table.

Note: At Third Street on G. N. Following Trains are Given the Same Time Over the Same Track.

	G. N.	C., St. P., M. & O.
7.43 a. m.	No. 10	No. 5
8.32 a. m.	No. 1	No. 4
4.43 p. m.	No. 52	No. 61
11.12 p. m.	No. 121	No. 10

The C., St. P., M. & O. are not shown on G. N. time-table.

Summary Crossing at Wilgus Street.

	West.	East.
C., M. & St. P.	5	5
C., M. & St. P., empty.	4	5
C., B. & Q.	7	7
C. G. W. empty	3	2
Totals	19	19
Transfer	101	

Summary Crossing at Sibley Street.

	West.	East.
C., M. & St. P.	17	17
C., St. P., M. & O.	4	4
N. P.	1	1
C. G. W.	16	17
Totals	38	39
Transfer	100	

In taking up the question a special study was made of the probable increase of traffic. The diagrams which were made, indicate that in the next 10 years the increase will be not less than 60 per cent. But Mr. Sperry's idea is that with the growth of the whole northwest, the traffic centered at St. Paul will increase at such a rate that transportation facilities not now even thought of will be required.

Proposed Improvements.

The plans submitted, plate 4, for enlarging the track facilities, have been worked out on the following lines: A. Additional Trackage in Train Shed. B. Separation of Passenger Traffic from Freight Traffic. C. Drill Track for Coach Yard. D. Interlocking and Track Work.

The proposition for increase of track gives 13,690 ft., as compared with 5,450 ft., the present length of train-shed tracks. This increase of 151 per cent. will provide standing room for 195 cars each 68 ft. long. The number of platforms is increased from five to nine, and the space between the station building and the ends of tracks is increased from 26 ft. to 48 ft., giving room much needed for handling baggage. The vestibule, or concourse, is increased in width from 19 ft. to 34 ft., and it is made possible to provide separate exits for passengers. Certain crossovers are added to make it possible for engines to run around their trains.

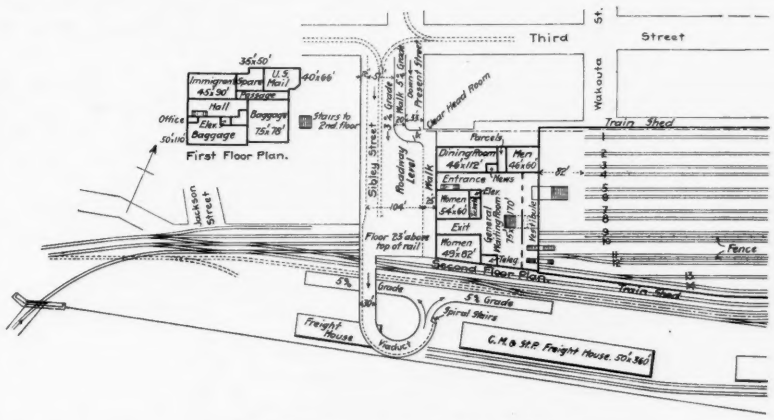


Plate 8.—Sperry on St. Paul Station.

Plan to Remodel St. Paul Union Station: First floor to be used for Baggage, Mail and Immigrants. Second floor to be used for all Waiting rooms and Dining room. Sibley street in front of Station to be brought to level with second floor on steel construction on a 5 per cent. grade down to Third street. East side of Sibley street from Third street to north side of Station to be maintained as at present. West side of Sibley street to be carried over tracks and reach levee by two inclines with a 5 per cent. grade. Third floor to be added to Station, reached by elevator for offices.

The proposed station will be on the site of the present station, and will be built on the island between the present tracks. The plan provides for the retention of the present station for the use of the tenant lines, and the new station will be built around it. The new station will be 360 ft. long, 100 ft. wide, and will have a clock tower 150 ft. high. The first floor will be used for baggage, mail and immigrants. The second floor will be used for all waiting rooms and dining room. Sibley street in front of station will be brought to level with second floor on steel construction on a 5 per cent. grade down to Third street. East side of Sibley street from Third street to north side of station to be maintained as at present. West side of Sibley street to be carried over tracks and reach levee by two inclines with a 5 per cent. grade. Third floor to be added to station, reached by elevator for offices.

The acquisition of property on the south will make it possible to add five tracks and one transfer track, but more room is yet needed to provide a proper coach yard and drill track.

Separation of passenger traffic from freight traffic will be accomplished by providing a double-track exclusively for freight traffic south of the passenger tracks, with double-track connections at both termini.

It has been impossible to materially improve the conditions of the coach yard. A drill track running parallel to the transfer tracks will make it possible to shift cars in the yard without interference with the transfer movements, but the tracks are short, and much handling of cars is necessary. In re-arranging these tracks a double lead should be provided to the turn-table, so that engines can run to and fro without blocking each other. A power house should be built to furnish steam for heating cars, air for interlocking and testing brakes, and cleaning cars, and a supply of hot water.

The interlocking contemplates three plants, namely, one at Sibley street, a yard tower on the line of Locust street, and a tower at Third street. The yard tower will control all switches leading to the train-shed tracks and crossings over the drill and transfer tracks. Semaphore signals are recommended; track circuits to control indicators at the tower, push buttons at convenient points at each platform to announce to the tower man that trains are ready to start. The present means of communication with the tenant lines is by five daily reports to the telegraph office in the station. The information received is frequently of little value because it comes too late. A telegraph office should be established in the yard.

grams have been made up, Plate 6 for the traffic at Third street, crossing at Willius street and Sibley street, and Plate 7 showing the new station for the heaviest hour.

At Third street some 40 trains each way on the Northern Pacific cross the path of 109 transfer movements. As the Northern Pacific at present is a single track, and on the new plan is double, a decided improvement is assured.

On the Great Northern there are the same number of passenger trains, but only 53 transfer movements. Between 8 and 9 a.m. the traffic is somewhat heavy, but can be handled easily during the rest of the day.

At Willius street the passenger traffic is light, about 20 trains each way, crossing 101 transfers. The yard shifting is on drill track parallel to the transfer, and the only movements from coach yard will be light engines and empty trains.

Sibley street is as busy a point as Third street, as the traffic, some 40 trains with 100 transfers, has to be moved on three through tracks, while at Third street there are seven. Again, Sibley street is at grade and has a busy street traffic—some 1,300 teams between 7 a.m. and 6 p.m.

The diagram for the station (Plate 7) shows time that each track is occupied, the train that uses it and the open time. This shows that between 8 and 9 a.m. there is a total of over five hours open time for the new station, as compared with practically none at present. This should be ample for a large increase. The diagram was worked out carefully with the Superintendent and Assistant Superintendent of Union Depot Company as to best method of handling the traffic, and can be relied upon.

Baggage and Mail.

The mail handled here, 140 tons per day, is but 10 tons less than at Boston South Station, where a mail yard of three tracks and driveway is provided. The only track in new plan available for mail is 14, on which it is proposed to place the mail cars of the different roads. C. M. & St. P. No. 57, bringing in 20 to 30 tons from the east, will be placed on track 13, which has a platform on both sides, so that mail can be moved from this train to the cars on track 14 with the least possible delay. The arrangement has the warm endorsement of the Superintendent of the Railway Mail Service. Track 14 is, however, not located convenient to the present mail room. A mail house could be placed in space between track 13 and west transfer track, but it could not be reached by mail wagons without crossing property of the

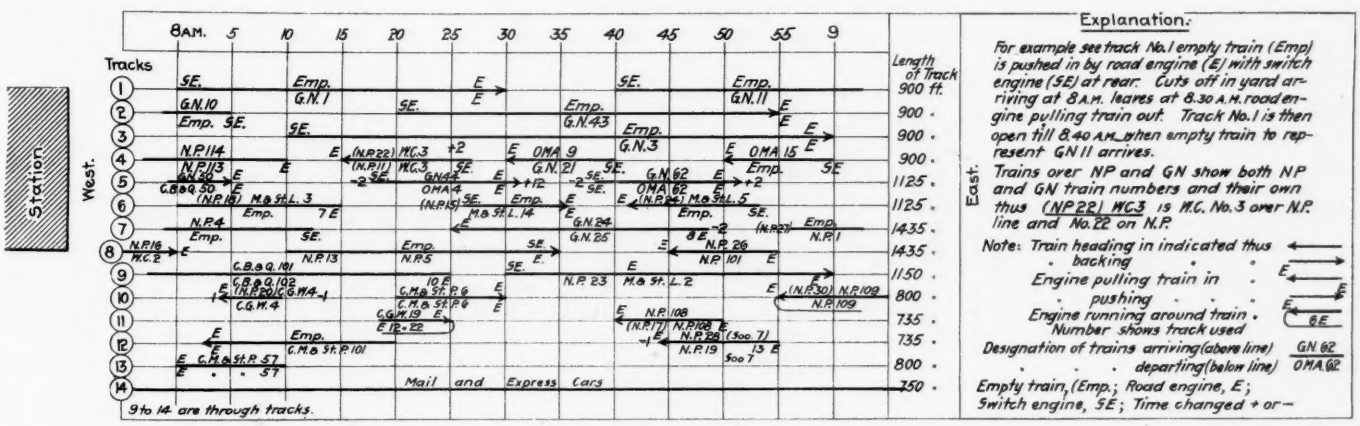

8AM. 5 10 15 20 25 30 35 40 45 50 55 9
Tracks
Length of Track
Station
West.
East.
9 to 14 are through tracks.
Mail and Express Cars
Explanation.
For example see track No. 1 empty train (Emp.) is pushed in by road engine (E) with switch engine (SE) at rear. Cuts off in yard arriving at 8 A.M. leaves at 8.30 A.M. road engine pulling train out. Track No. 1 is then open till 8.40 A.M. when empty train to represent GN 11 arrives.
Trains over NP and GN show both NP and GN train numbers and their own thus (NP 22) WC 3 is W.C. No. 3 over N.P. line and No. 22 on N.P.
Note: Train heading in indicated thus
backing
Engine pulling train in
pushing
Engine running around train
Number shows track used
Designation of trains arriving (above line)
departing (below line)
Empty train, (Emp.; Road engine, E;
Switch engine, SE; Time changed + or −

Plate 7.—Sperry on St. Paul Station.

NOTE.—*Diagram showing time that new tracks will be occupied for the hour of heaviest traffic 8 to 9 a. m.; based on time-table June 9, 1901, with M. & St. L. trains added.*

The increase in length of tracks is one of the most important changes. There is now not one track long enough to hold a standard Great Northern overland train without its extending over the switches, and this is one of the causes of much of the present trouble. This train, made up of an engine and 10 cars, is 739 ft. 7 in. long, but, of course, one or two extra cars must often be added to other regular trains, and special trains of 12 or more cars are not infrequent.

C., M. & St. P. Ry. The question of a mail room will require further consideration.

In conclusion, it is believed that the proposed track facilities will compare favorably with any station in this country. Delays will be reduced to a minimum, and ample room provided for a large increase of traffic.

The plan for the enlargement of the station building is shown in a general way on Plate 8. It gives an increase of nearly 100 per cent. in the room, without buying any additional property. This increase is greatly needed. The baggage handled there during a year amounts to the average of 2,216 pieces a day. At the Grand Central Station a report for one month (March) shows an average of 2,654 pieces a day, but the Grand Central does its work in two large baggage rooms, and in St. Paul it is done in one small room. Under existing arrangements it is necessary for passengers to cross four different tracks at grade, a matter involving constant risk. It is proposed to put the waiting room on the second floor, leaving the entire first floor free for baggage and emigrants, which will double the space in front of the station for team and foot travel. The traffic will also be divided; foot passengers, carriages and teams, to and from the levee, will use the upper level; baggage, express and mail the lower level. Separate entrance to and exit from the station is also provided.

Judicial Decisions on English Freight Rates.

The thirteenth annual report of the British Railway and Canal Commission shows about 142 cases heard in the past year, though many of the later ones are not yet finished. The Commission has power over all questions arising under the Railroad and Canal acts of from 1854 to 1894. One of its chief tasks is to consider questions of rebates on rates which include carting and terminal charges when the traffic is handed over to private firms at their own private sidings, and when no cartage or terminal charges are incurred. The Commission has also the duty of looking over all working agreements between companies, and during the past year approved three, namely, those between the Cambrian Railway and the Tanat Valley light railway, the Highland and the Dornock light railway, and the Highland and the Wick & Lybster light railway. This is an important duty, and of great value, since the bringing of such contracts before the Commission prevents the strong standard gage lines from exacting unfair remuneration for working the traffic of the less important secondary lines. The most numerous cases are those in which rebates are to be allowed for work not performed or allegations of unjust discrimination against ports and by certain routes. Perhaps the most important case affecting passenger traffic was No. 7, in which the Great Eastern was asked to run more workmen's trains from Palace Gates to London. The court made no order as the company promised to provide the desired service.

In No. 14 the traders demanded that the North Eastern desist from giving a preferential rate to Hull for flour and grain as against Goole. The court found the charge proved and made the order restraining the companies in question from continuing to do this, and also required them to discontinue discriminating in the matter of collection of charges for Hull as against Goole.

Case No. 20 was a question of delivery of coal at the plaintiff's siding and the North British was ordered to deliver and take coal as asked for. In No. 28 plaintiff made good his case for a refund of amounts charged by the Caledonian Railway in excess of the former rate from Dec. 31, 1899, for carriage of coal and dross from the applicant's colliery.

Several cases referred to the carriage of timber and the measurement thereof. The court found that the most accurate mode of measurement of round timber is by string under the bark, with a divisor of 113, with reasonable allowances for any irregularity or defect in the timber measured.

The Inverness Chamber of Commerce failed in its attempt to restrain the Highland from issuing season tickets to traders whose trade was worth from £250 to £1,250 at rates less than those regularly quoted.

Perhaps case No. 41 is the most important. It arises from the Midland giving a commission to a firm of coal dealers, Messrs. Ricketts & Smith, for all shipments over the road beyond a certain figure, this commission payment has been declared to be unjust and one other firm has obtained an order compelling the Midland to refund money paid for the last six years in excess of that which would have been due had the preferential rate been charged. This shows the extreme danger of attempting to cut rates by private rebates in England. There appear to be 75 cases of a like nature which are entered, but which are not yet decided, though there is no doubt many will be settled out of court. It is a question how much this will cost the company, though it must be a large amount.

R. HOPE.

Shop Improvements on the Southern California R. R.

Work on the enlargement and extension of the shops of the Southern California R. R. (Santa Fe system), at San Bernardino, Cal., was begun in the early summer, the contract having been let to B. Lantry & Sons for $107,000. Mr. G. R. Joughins, Mechanical Superintendent, has sent us drawings from which the illustrations are made.

The tract on which the shops are situated lies in the western part of the city between Kingman avenue and Third street, east and west streets, and I street and Mt. Vernon avenue, north and south streets. Besides the shops the plat contains the yards and the freight and passenger depots of the company. The new buildings and extensions to the old are shown by cross-hatching in the general layout. The machine shop is being extended to the north a distance of 200 ft., making the entire structure 350 ft. long; the width of this extension is 110 ft., or 20 ft. wider than the old shop. Across the old transfer table from the old machine shop was the car shop, which is being converted into a boiler shop, with an annealing furnace for boiler plate in the rear. A large new car shop and mill, 275 x 110 ft., is being built at the eastern end of the shop grounds, across a new transfer table from which is the coach paint shop, 275 x 90 ft. Other new buildings are a tin and copper shop and a brass foundry under one roof, the building being 125 x 50 ft.; a pattern storehouse, 60 x 30 ft.; a fire service house, 40 x 24 ft.; and a new office. The present 10-stall roundhouse is to have its capacity doubled, and the upholstery shop which was located back of the old car shop, will be moved to the vicinity of the new shop, as shown. Three new ice houses have recently been built to the southeast of the location of the new car shop.

The machine and erecting shop extension is of brick on concrete foundations. The roof is of tiling, the trusses supporting which are carried by 12-in. channel-iron columns, spaced 22 ft. centers. The shop will be well lighted, the east wall being provided with numerous broad windows and the doors on the west side being well glazed. In addition, the monitor is designed to supply light and also ventilation, double-window transoms and louvres alternating throughout its length. On the erecting side there are nine pits, over one of which there is to be an engine hoist for lifting locomotives off of their drivers, a very convenient device in the absence of overhead cranes. These pits are all 34 ft. long and 4 ft. wide. They are to be built of concrete with a timber coping on the side walls, and drain toward the outer or west end, each one having a sump connected to the sewer by a 6-in. drain. The flooring of the shop is to be secured to redwood sills, imbedded in coal or volcanic cinders mixed with Bakersfield oil. The whole interior is to be excavated to a depth of 1 ft. 8 in. below the base of rail, for filling with the cinders.

The new car shop and mill is 275 x 110 ft., as already stated. In construction it will be similar to the machine shop extension, all foundations for walls and columns being of concrete, the walls of brick and the roof of terra cotta tile. The roof trusses are wooden with a central support of 8-in. channel-iron columns, the spacing for trusses and columns being 22 ft. centers in the car shop part. The north end of the shop will be used as a mill and will be separated from the car shop by a 12-in. fire wall, carried to the roof. This end will have a second floor for a cabinet and pattern shop. Special trusses 3 ft. deep and spaced 12 ft. between centers, designed to carry the shafting for the mill and also the joists for the second floor, are swung to the roof trusses at right angles to them, or lengthwise of the building. The car shop contains nine tracks for cars.

The coach paint shop is located opposite to, and west of, the car shop and mill, a 70-ft. transfer table having a 250-ft. travel being between the two buildings. Sufficient room is allowed between the buildings and the transfer table to accommodate the longest cars, the distance to the car shop being 100 ft. and to the paint shop 80 ft.

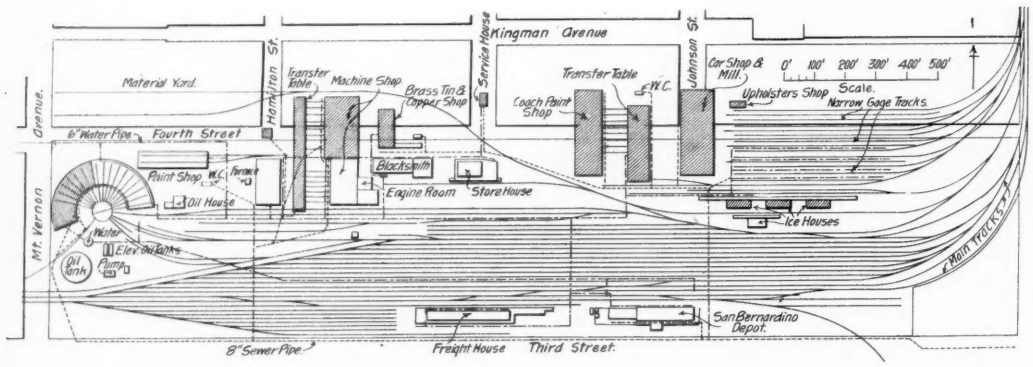
In general appearance the paint shop is similar to the car shop, though the width of the former is 20 ft. less than the latter. The roof trusses are carried by rows of 8 x 8-in. posts between the tracks, spaced 14 ft. 6 in. center to center. The iron hinge-sockets for the painters brackets are bolted to these posts. There are 11 tracks, each of which has under it a pit 70 ft. long, 4 ft. wide and 2 ft. 2 in. deep made of concrete and plastered with cement; each pit is provided with steam radiators on each side, running the full length. The entire floor space is to be laid with sidewalk concrete according to Los Angeles city specifications for 4-in. sidewalks. The north end of the building is partitioned off for a sash wash and varnish room.

The brass foundry and tin shop occupy one building, 50 x 125 ft., the former being 50 ft. long and the latter 75 ft. This building will be of galvanized corrugated iron over a wood framing, the roof being of the same material.

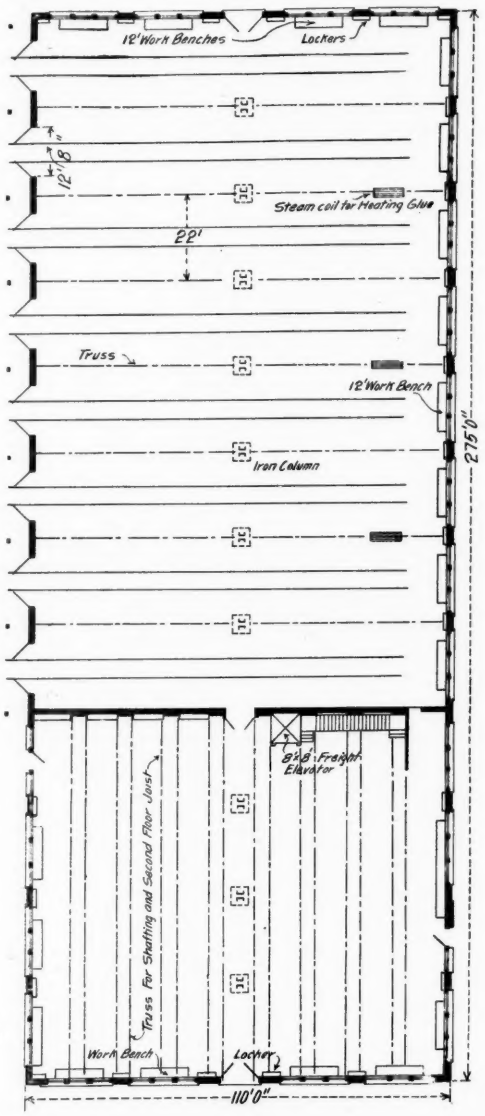
The pattern store house, 30 x 60 ft., will be brick with wooden roof trusses laid over with Ludowici tile. All windows are to have iron shutters and the doors will be sheathed with galvanized iron. The floor is to be 6 in. of gravel filling.

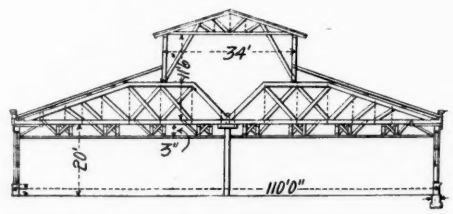
The fire service house is a two-story frame structure, 24 x 40 ft., with board roof covered with asphalt, and ceiled throughout inside.

A large annealing furnace for boiler plate is to be in the rear of the boiler shop. The structure is approximately 12 ft. square, resting on brick footings and having walls of ¾-in. iron plate outside of masonry; the roof is No. 22 corrugated iron. The annealing oven is lined with fire brick, the roof being arched and having



General Layout of Shops and Yards—San Bernardino, Southern California Railway.

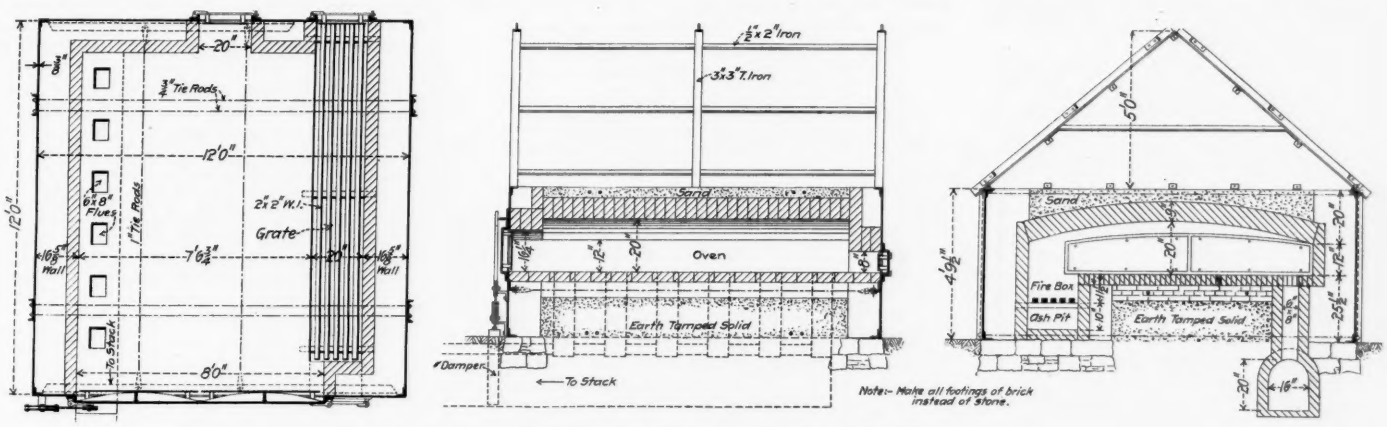




Car Shop and Mill—San Bernardino Shops.

a sand filling above. A plan and sections of this furnace are shown.

Ten additional stalls will double the capacity of the old roundhouse and complete the semi-circle. In addition to the building improvements, changes in the tracks in the shop yards will be made and considerable new track laid. The grounds and buildings will be piped for water, steam and compressed air, quite extensive use being made of the latter in all of the shops.



Annealing Furnace for Boiler Plate—San Bernardino Shops.

The Value of the Railroads and Their Capitalization.*

. . . Satisfactorily to ascertain the value of railroad property would involve a task even more difficult than to discover its original cost, unless the definition of value should be modified as to refer to nothing more complicated than the relation between certain arbitrarily selected rates of return on investments and the amounts currently paid to investors. . . . In obtaining statistics of manufacturers the common practice is to avoid these difficulties by the expedient of regarding value as the equivalent of present cost of duplication less suitable allowances for depreciation. This method is thoroughly practicable and might be applied, though perhaps somewhat less satisfactorily, to railroads. It fails, however, to take cognizance of the value pertaining to those advantages of situation which are not directly ascertainable from land values. Obviously real value of property and capital invested in railroads are synonymous terms. If the one were ascertained, the other would be revealed. It is probably a coincidence, rather than a result of any law, that if the very simple conception of total railroad values first suggested should be adopted and the reasonable rate of return should be placed at 4 per cent., the true value of railroad property for June 30, 1900, which would result would be $9,040,567,350, which is but 2.70 per cent. in excess of $8,803,156,067, the aggregate par value of stocks and bonds on that date, exclusive of those owned by railroad corporations. . . .

It is not improbable that, when the conditions of the railroad industry are more adequately comprehended than they are at present, it will appear that popular opinion has attached far too much importance to capitalization. The term "capitalization" indicates the aggregate of the par values of the various forms of securities, including all stocks, bonds, and other forms of indebtedness except current liabilities. Certainly the prospect of satisfactorily solving a grave problem by so strange a method as one involving the addition, at their par values, of mortgage bonds paying not less than 3 per cent. interest per annum, as did all but 15.83 per cent. of American railroad bonds in 1900, and stocks on which no dividends were paid, represented in the same year by 54.34 per cent. of the total, would be slight indeed. It is not suggested that the method adopted fails to serve a legitimate purpose in a suitable way, but that the end to which such a method is adapted can be an important one is most emphatically denied. The incongruity of the items which make up the total that is properly designated as the capitalization of the railroads of the United States, is made evident by the table below.

The amount reported as "total railroad capital" as of June 30, 1900, is $11,491,034,960, being the aggregate of the sums of the second and fourth columns of the foregoing table plus $60,308,320, the par value of the equipment trust obligations outstanding on that date. The Statistician warns those who use the report against improper use of the capitalization statistics in the following terms:

"It should be noted that this is the commercial use of the phrase 'railroad capital.' It is not what the economist terms capital nor should the figures . . . be accepted as measuring the value of the property."

Railroad Stock and Funded Debt—Rates of Dividend or Interest, Year to June 30, 1900. (Interstate Com. Com.)

	Stocks.		Funded debt.	
Per cent. paid.	Par value, (000,000 omitted).	Per cent. of total stocks.	Par value, (000,000 omitted).	Per cent. of total funded debt.
Nothing	$3,177	54.34	$379	6.78
From 1 to 2	133	2.27	235	4.21
" 2 to 3	105	1.81	271	4.84
" 3 to 4	356	6.10	1,281	22.95
" 4 to 5	851	14.56	1,833	32.82
" 5 to 6	405	6.93	876	15.69
" 6 to 7	251	4.29	485	8.68
" 7 to 8	374	6.40	204	3.68
" 8 to 9	104	1.78	10	.18
" 9 to 10	4	.08	3	.06
10 and above	84	1.44	6	.11
Total	$5,845	100.00	$5,583	100.00

But is it true that the amount given is railroad capital, even in the commercial sense? In spite of the fact that notable increases in the par value of railroad securities are frequently accompanied by significant decreases in the amounts demanded by the owners of those securities, popular sentiment does attribute much importance to aggregate capitalization and persists, it is believed with little reason, in insisting that it materially influences the rates charged. Consequently the general public is ill served and the rights of the owners of railroad property are infringed when statistical methods are followed which exaggerate this aggregate.

The apparent capitalization is exaggerated by the plan of presentation adopted by the Statistician. This plan substantially ignores the fact that a large proportion of the total par value of railroad securities is owned by railroad corporations and is therefore effectually cancelled by other capital issues. It is true that every report except the first has contained a statement showing separately the amounts of railroad stocks and bonds owned by railroad corporations, but these amounts, which should be deducted from the aggregate formed by adding the outstanding securities of the several corporations, are ignored in the general statements of capitalization and in their textual analyses. The extent of this exaggeration is shown by the following table:

Railroad Capitalization. (000,000 *Omitted.*)

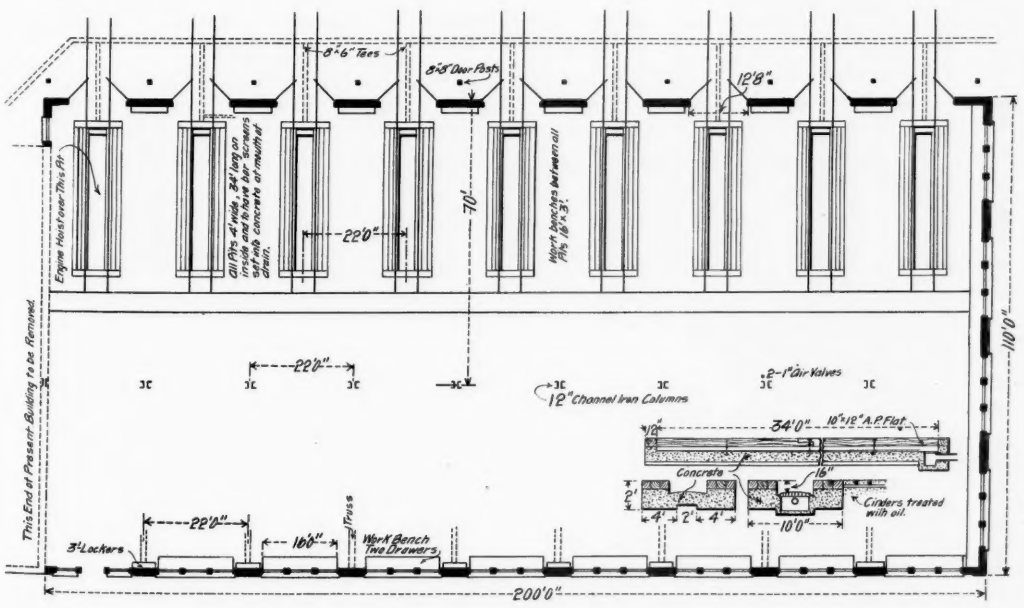
On June 30.	The correct amounts. Par value.	Stocks and bonds owned by railroads. Par value.	Total reported as railroad capitalization. Par value.	Extent of the exaggerations. Per cent.
1900	$9,548	$1,943	$11,491	20.35
1899	9,432	1,602	11,034	16.98
1898	9,297	1,521	10,819	16.36
1897	9,168	1,467	10,635	16.00
1896	9,066	1,501	10,567	16.56
1895	8,900	1,447	10,347	16.26
1894	8,647	1,544	10,191	17.86
1893	8,332	1,563	9,895	18.76
1892	8,295	1,391	9,686	16.78
1891	8,008	1,283	9,291	16.02
1890	7,577	1,407	8,984	18.57

When public opinion regards railroad capitalization as excessive, as it undoubtedly does; when a widely prevalent prejudice conceives that this over-capitalization is the cause of high rates, and when not a few citizens honestly believe that the total par value of railroad securities has been increased with the deliberate purpose of defrauding the shipping and traveling public and deceiving legislative bodies, the adoption by a Federal statistical agency of a method which exaggerated the total capitalization existing on June 30, 1900, by more than one-fifth of the actual amount, and has never failed to overstate it by at least 16 per cent., is a matter of no slight moment. That the danger lurking in the method adopted is not less than has been suggested is demonstrated by the fact, that although he had used substantially the same form of presentation for 12 years, so accomplished a statistician as Professor Adams was so far misled as to make the fictitious increase in capitalization between June 30, 1899, and the corresponding date in 1900 the basis of an unfavorable criticism of current methods of railroad finance, although a closer examination of the figures presented on the adjacent pages of his report would have shown that the increase in actual capitalization was only 25.37 per cent. of that which was made the basis of the adverse comment. The criticism referred to was expressed as follows:

". . . it is pertinent to notice that the increase of $457,080,062 in railroad securities is synchronous with an increase in mileage of 4,051.12 miles. It can hardly be claimed that the issue of securities for the construction of this new mileage would exceed $120,000,000, which would leave an increase of $337,080,062 to be explained in some other manner. *Whether facts of this sort be regarded in their bearing upon the adjustment of rates or as a question of equity in the conduct of a quasi-public business, they certainly present a problem in which the public has a legitimate interest.* . . . It is a significant fact, and not entirely in harmony with the trend of previous years, that the increase in stock is more than two and a half times as great as the increase in funded indebtedness. Ordinarily this would be regarded as a helpful tendency, but this can hardly be so interpreted in the present instance, in view of the fact that the increase in bonded indebtedness alone is in excess of the probable cost of railroad construction during the year."

There was an increase of $457,080,062 in the aggregate obtained by adding the outstanding capitalization of all railroad corporations, but $341,137,182, or 74.65 per cent. of this amount, was cancelled by the increase in the holdings of railroad securities by railroad corporations. The actual increase in capitalization amounted to $115,942,880, or less than the amount which the Statistician suggested as a suitable addition on account of the 4,051.12 miles of new construction.

If the tendencies that have recently been most prominent in the development of inter-corporate relations are maintained, the present method of dealing with capitalization in the annual reports will have to be abandoned, for the error will constantly increase in proportion. A



Addition to Machine Shop.

*H. T. Newcomb in the *Yale Review*, August.

single example will illustrate the possibilities. The Lake Shore & Michigan Southern, substantially all of the stock of which is held by the New York Central, owns $15,018,000 in par value of the stock of the New York, Chicago & St. Louis. On the assumption, which is absolutely necessary to justify the addition of stocks and bonds at their par values for any purpose, viz., that all securities are equivalent to each other at their face values, this $15,018,000 of New York, Chicago & St. Louis capitalization is represented by $15,018,000 of Lake Shore & Michigan Southern securities, which, in turn, is represented by $15,018,000 of New York Central issues. Clearly, on this assumption, there is only $15,018,000 of real capitalization so far as the public is concerned, as all of the securities, except those of the New York Central, are owned by the railroad corporations, and are really nothing but a part of the basis of the capitalization of the latter company. Yet, in the report these items are represented by an addition to the aggregate capitalization of $45,054,000, or three times the amount on which a return would have to be obtained out of operating earnings if the theory which asserts that capitalization controls rates were correct and three times the amount which could in any material way affect the traveling and shipping public. The Pennsylvania Railroad Company alone owns stocks and bonds, most of them of other railroad companies, holding a total par value of $298,014,949. Had only securities in the hands of the public, exclusive of railroad corporations, been regarded in the reports, the average capitalization per mile of line on June 30, 1900, would have appeared as $51,090 instead of $61,490, showing a decrease, from June 30, 1899, of $674 instead of an increase of $934.

The Sharp Journal Box.

Mr. W. E. Sharp, Superintendent of the Armour Car Lines, Chicago, has recently been granted a patent on a dust-proof oil box, illustrations of which are shown in the accompanying engravings. The specification forming part of the letters patent states that the primary object of the invention is "to effect certain improvements in the lids and lid-closing mechanism of boxes of this character, looking to the more effectual and perfect exclusion of dust, grit, dirt, and all objectionable foreign matter from the outer end of the box than has heretofore been possible." The means adopted by Mr. Sharp to accomplish this are apparent from the engravings.

Fig. 1 shows a vertical longitudinal section. The feature to which attention is especially directed is the manner of hinging the lid, which, it is thought, will effectually prevent the entrance of dust and dirt at this point. The top wall of the box is extended as a boss which overhangs considerably the body of the box at its forward end. The width of this boss is approximately one-half of the width of the box. Running across the outer end of the top wall of the box and passing underneath this boss is an acute-angled groove into which fits a corresponding lip on the lid, Fig. 2. The lid is grooved on each side, as will be seen in Fig. 2, and at the bottom a lip on the lid overhangs the bottom wall of the opening when the lid is closed.

To hold the lid tightly closed a flat steel spring is employed which is seated in a groove on the inner face of the lid, its lower end resting in a cored pocket. The upper end projects into a recess or pocket on the under side of the over-hanging lug already described. The wall of this pocket with which the spring comes in contact is made perfectly straight, while the under surface of the boss is of rounded form, so that where these two surfaces meet a sharp-edged shoulder is formed. The result is that when the lid is raised the spring, coming in contact with this shoulder, is flexed, tending to force the lid shut. As the lid is opened wider, this pressure is relieved and the spring slides upon the rounded surface of the under side of the boss. When slightly past the horizontal position it passes out of contact with the boss altogether and the lid may be laid back upon the top of the box. In closing, as the spring passes the shoulder the increased flexure of the spring causes the lid to snap shut.

There is very little machine work required on the box, and Mr. Sharp is now having metal patterns made and will provide for chilling the surfaces of contact between the lid and box, in order that this machine work may be reduced to a minimum. This box is the adopted standard of the Armour Car Lines.

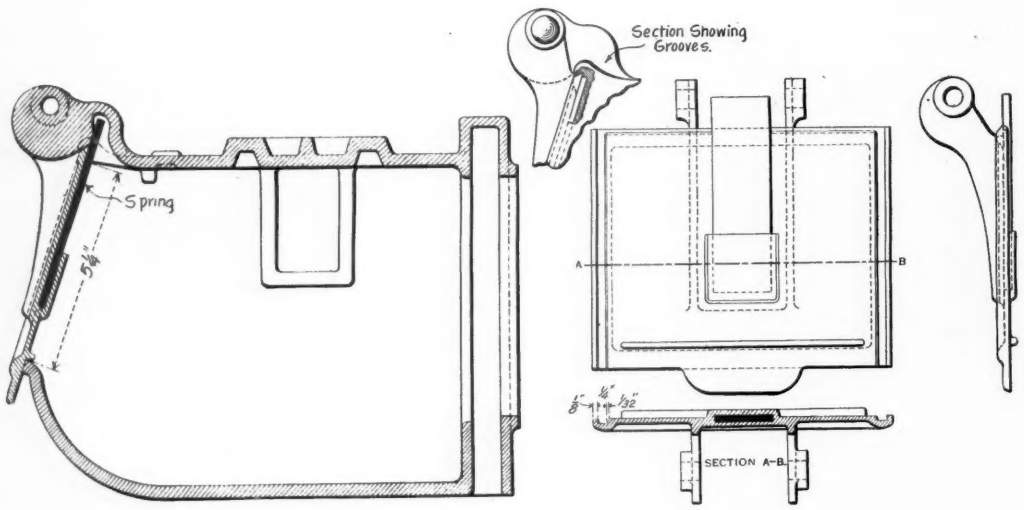
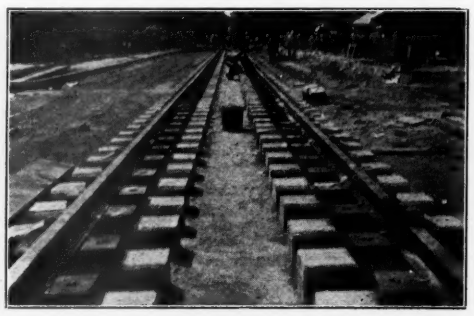


Fig. 1.—Section of Box. *Fig. 2.—Detail of Lid.*

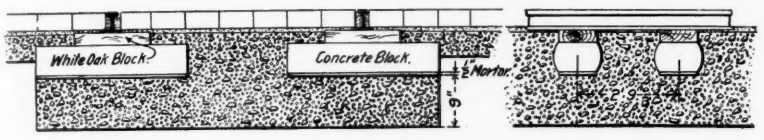
Sharp's Journal Box.

The Kimball Concrete Tie.

An illustrated description of the concrete tie designed by G. H. Kimball, Chief Engineer of the Pere Marquette Railroad, was given in our issue of March 14. That article also said that preparations were being made for laying three-quarters of a mile of track with this tie where the Pere Marquette enters Bay City, Mich. This was due to the paving of Jefferson street, requiring permanent track construction. The accompanying engraving from a photograph shows this work in progress, and the line drawing shows the details of the construction used. As will be seen from the latter, the ties are laid in cement mortar on a bed of concrete, and were set to a true grade with an engineer's level. The rails rest on white oak blocks, necessary for cushion and spiking, this being the only perishable material used in the work.



The Kimball Tie in a City Street.



The Kimball Tie in a City Street.

The steel channels used in the regular form of tie have been omitted in this case, as the ends of the concrete blocks or ties abut against the pavement foundation and are thus held securely in place.

These composite ties are now being made following the design shown in the article previously referred to, and it is intended to put these under track in ordinary ballast where traffic is heaviest and high speeds are maintained.

Electric Competition in England.

At the half-yearly meeting of the North-Eastern Railway the Chairman said:

"One other subject which I must name to you is that we have been giving a great deal of attention to the diversion of passenger traffic from the railroad in some districts owing to the existence of electric tramways. I am not an alarmist, nor do I think my board is alarmed at this competition being thrust upon us, but it ought to be fought to a certain extent. It is confined, at all events for the present, to the very short-distance traffic, and, therefore, it does not seriously affect our revenue; but we must do our best to protect and keep even our short-distance traffic, and we think the best way of meeting the new competition affecting some of our lines about Newcastle is to increase the train service on those lines by running more frequent trains. We must provide for the public traveling facilities which will, if possible, keep them on our line. Tramways give, and do offer, attractions by charging fares below what a railroad company can prudently charge, but the attraction due to the frequency of the tramway service in the streets is one that we can, to some extent, meet by increasing the number of trains on our own line. There are many difficulties in the way of doing this by means of steam locomotives, and we have carefully considered the question of using electric traction, with the result that we have almost decided to equip 37 miles of railroad in the neighborhood of Newcastle and Tynemouth with electric traction. This step, of course, is in the nature of an experiment, but we believe it will be a successful one. We hope to secure not only a fuller train service for the public, but also greater economy in working. We have advertised for tenders for the electrical equipment of the lines in question. Those tenders are to be sent in by October 7 next, and the board will come to a final decision in this matter after they have received and considered those tenders, and looked at what the work will cost."

Engineering (London) contains some description and discussion of the technical project for the North Eastern electrifying. The section selected is on the north bank of the Tyne, from the central station in Newcastle, to Tynemouth, thence north along the coast a short distance, and then westward parallel to the Tyne and about three miles distant, so looping back to the starting point. There is a branch across the loop near the Newcastle end and a couple of other short branches. The total length is about two miles of four-track line, 35 miles of double-track and four miles of single track. There are about 80 cross-over roads in the project.

Each train will consist of two motor cars and one trailer. The average speed will be about 22 miles an hour, with 20-seconds stop at each station. It is proposed to have 47 trains in operation. On the single track Quayside branch of four miles, electric locomotives will be used and six goods trains per hour will run, each carrying about 150 tons. These will be hauled by electric locomotives about three-quarters of a mile and then coupled to steam locomotives.

Passenger cars are to be compartment cars 49 ft. long; they will seat 204 passengers, 24 of these being first-class. There will be two motors to each coach. Electric current will be taken from an existing power supply company.

At the half-yearly meeting of the Midland some remarks of the Chairman are reported thus:

"The sanction of the shareholders will be sought for the promotion of a light railroad between Burton-on-Trent and Ashby-de-la-Zouch. He explained that the Light Railways Bill of 1896 provided that its powers were not to be used in the promotion of lines to compete with existing railroads, and in these circumstances the Light Railway Commissioners were bound to throw out this scheme which was being locally promoted, but at the same time expressed their regret that they were obliged to do so, because they thought that in the interests of the public the railroad in question ought to be constructed. The local promoters approached the Midland directors, and the latter, in view of the opinion expressed by the Commissioners, now propose to build the line themselves. The line will be worked by electricity, the capital £160,000, and the length 11 miles 4 chains.

"Whilst on the subject of electric traction the chairman said that, so far as the Midland is concerned, there is really no part of the line which lends itself particularly to this mode of traction. Although the Midland directors have no present intention of doing anything in this direction, Sir Ernest added that engineers generally consider that electricity will in the future be the means of traction, but when he could not say. Whenever it does happen it will be gradual. For instance, the Midland Company owns 2,700 locomotive steam engines, and these engines have cost between five and six million sterling, and the directors could not possibly contemplate the 'scrapping' of such a large number of locomotives all at once. Three or four hundred engines as they come into the works for renewal would have to be renewed as electric motors, and a certain portion of the line adapted for their use. That process would go on until the whole line was electrified, but it would

take some time. In the past half-year 95 engines were renewed, and on that basis it would take something like 15 years to get rid of these locomotives, but if the directors came to the conclusion that it was the right thing to do, it could, no doubt, be accomplished quicker than that.

"There is one portion of the line, or rather a portion of the line in which the Midland is interested—namely, the Cheshire Lines—on which electricity might be used with good result, and that is the portion from Manchester to Liverpool. The Cheshire Lines belong to three companies—the Great Northern, the Midland, and the Great Central."

Passenger Locomotives for the National Railroad of Mexico.

The Brooks Works of the American Locomotive Company have delivered ten 10-wheel passenger engines to the National Railroad of Mexico. These engines are evidently intended for heavy passenger service. The boiler has 2,754 sq. ft. of heating surface. The total weight of engine is 172,000 lbs. with 133,000 lbs. on drivers. The cylinders are 20 x 28 in. and the maximum tractive power is 28,000 lbs. This latter value is but 21 per cent. of the total adhesive weight and insures that the maximum draw-bar pull can be obtained, under average condition of rails, without the use of sand. The drivers are 68 in. in diameter. The tender has a capacity of 7,000 gal. of water and 12 tons of coal, and in this respect is well up to the limit for passenger service.

Acetylene gas is used for the headlight and the small gas generator is to be seen outside the cab on the fireman's side. This is an unusual position, but owing to the long fire-box, and consequent lack of room in the cab, this arrangement was made necessary.

All the drivers are equipped with American outside equalized brakes; the tender and train have the Westinghouse automatic brakes. A general description follows:

Gage	4 ft. 8½ in.
Kind of fuel to be used	Bituminous
Weight on drivers	133,000 lbs.
Weight on truck wheels	39,000 lbs.
Weight, total	172,000 lbs.
Weight tender loaded	140,000 lbs.

General Dimensions.

Wheel base, total, of engine	25 ft. 7 in.
Wheel base, driving	14 ft. 6 in.
Length over all, engine	39 ft. 4 in.
Length over all, total, engine and tender	66 ft. 3 in.
Height, center of boiler above rails	8 ft. 9 in.
Height of stack above rails	14 ft. 11½ in.
Heating surface, fire-box	177 sq. ft.
Heating surface, tubes	2,554 sq. ft.
Heating surface, water tubes	23 sq. ft.
Heating surface, total	2,754 sq. ft.
Grate area	35.2 sq. ft.

Wheels and Journals.

Drivers, number	6
Drivers, diameter	68 in.
Drivers, material of centers	Cast steel
Truck wheels, diameter	33½ in.
Journals, driving axle, size	9 x 12 in.
Journals, truck axle, size	5½ x 12 in.

Cylinders.

Cylinders, diameter	20 in.
Piston, stroke	28 in.
Piston rod, diameter	3¾ in.
Main rod, length center to center	10 ft. 10 in.
Steam ports, length	25½ in.
Steam ports, width	1⅞ in.
Exhaust ports, least area	65 sq. in.
Bridge, width	2 in.

Valves.

Valves, kind of	Improved piston
Valves, greatest travel	5 15/32 in.
Valves, outside lap (exhaust)	0 in.
Valves, inside lap (steam)	1⅛ in.
Valves, lead in full gear	1/16 in.

Boiler.

Boiler, type of	Wagon top
Boiler, working steam pressure	200 lbs.
Boiler, diameter of barrel, front	67⅞ in.
Seams, kind of horizontal	Sextuple
Seams, kind of circumferential	Double
Thickness of tube sheets	⅝ in.
Thickness of crown sheet	⅜ in.
Crown sheet stayed with	Radial stays
Dome, diameter	30 in.

Fire-box.

Fire-box, length	10 ft. 4 in.
Fire-box, width	3 ft. 6 in.
Fire-box, depth front	77 in.
Fire-box, depth back	60 in.
Fire-box, water space, width	Front, 4 in.; sides, 5½ in.; back, 6 in.
Grate, kind of	Rocking

Tubes.

Tubes, number	348
Tubes, material	Charcoal iron
Tubes, outside diameter	2 in.
Tubes, length over sheets	14 ft. 1 5/16 in.

Smoke-box.

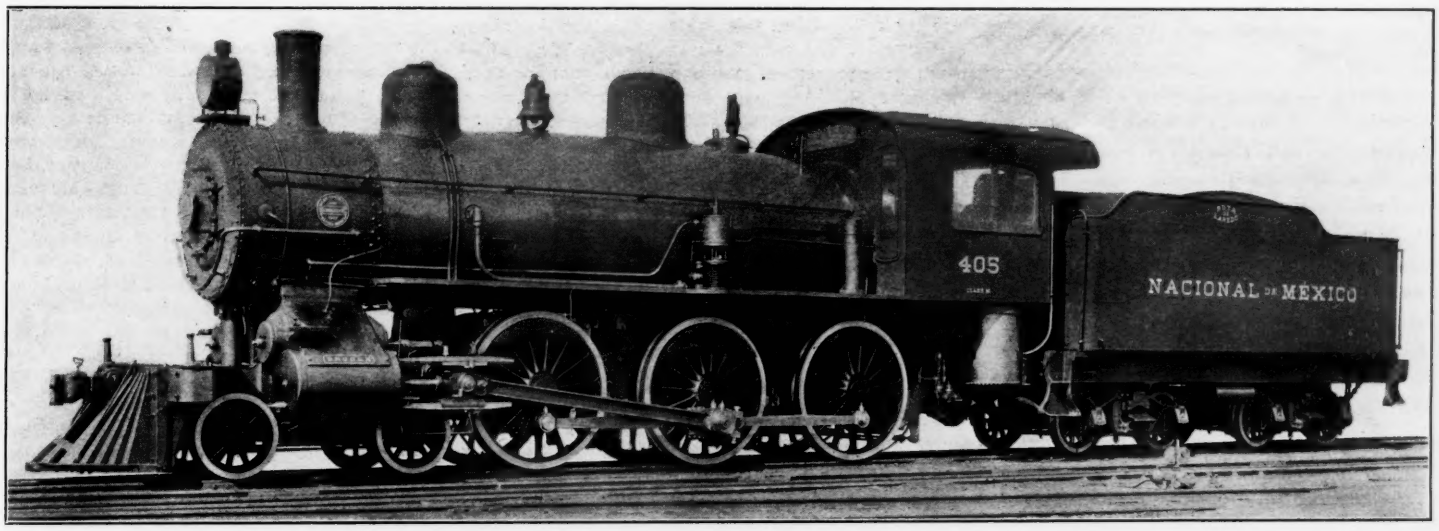
Smoke-box, diameter	71 in.
Smoke-box, length	64½ in.

Other Parts.

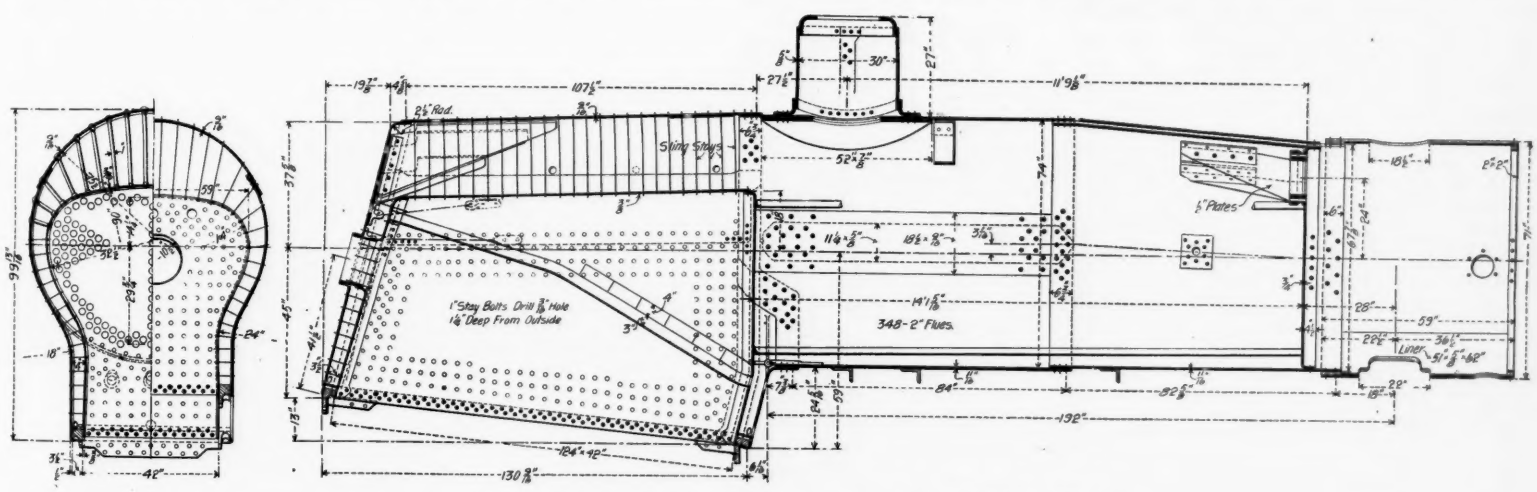
Exhaust nozzle, single or double	Single
Exhaust nozzle, variable or permanent	Permanent
Exhaust nozzle, diameter	5¾ in.
Exhaust nozzle, distance of tip below center of boiler	5½ in.
Netting, wire or plate	Wire
Netting, size of mesh or perforation	2½ x 2½ in.
Stack, straight or taper	Taper
Stack, least diameter	15 in.
Stack, greatest diameter	17⅛ in.
Stack, height above smoke-box	3 ft. 3 in.

Tender.

Type	8-wheel
Tank capacity for water	7,000 gal.
Coal capacity	12 tons
Kind of material in tank	Steel
Thickness of tank sheets	¼ in.
Type of underframe	Steel channel
Type of truck	Basic steel bolsters
Type of truck spring	Triple elliptic
Diameter of truck wheels	33½ in.
Length of tender frame over bumpers	25 ft. 10 in.
Length of tank	23 ft.
Width of tank	10 ft.
Height of tank, not including collar	5 ft. 5 in.



Ten-Wheel Passenger Locomotive for the National Railroad of Mexico.



Boiler of Ten-Wheel Passenger Locomotive for the National Railroad of Mexico.

Methods of Choosing Railroad Commissioners.

In Alabama just now there is considerable agitation of the question of having the State Railroad Commissioners elected by the people, and the *Montgomery Advertiser* has compiled the following list, showing how commissioners are selected in each of the 32 States where regulations of this kind exist.

Alabama—Appointed by the Governor, by and with the advice and consent of the Senate.

Arkansas—Elected by the people.

California—Elected by the people.

Connecticut—Appointed by the Governor.

Florida—Elected by the people.

Georgia—Appointed by the Governor by and with the advice and consent of the Senate.

Illinois—Appointed by the Governor.

Iowa—Elected by the people.

Kansas—Chosen by the Executive Council.

Kentucky—Elected by the people.

Louisiana—Elected by the people.

Maine—Appointed by the Governor.

Massachusetts—Appointed by the Governor.

Michigan—Appointed by the Governor.

Minnesota—Elected by the people.

Mississippi—Elected by the people.

Missouri—Elected by the people.

Nebraska—Three "secretaries" appointed by the Attorney General, Auditor, State Treasurer and Commissioner of Public Lands and Buildings. These three "secretaries" do the work of the "Board of Transportation."

New Hampshire—Appointed by the Governor.

New York—Appointed by the Governor.

North Carolina—Elected by the people.

North Dakota—Elected by the people.

Ohio—Appointed by the Governor.

Pennsylvania—No Commissioner; but the deputy "Secretary of Internal Affairs" supervises railroad reports.

Rhode Island—Appointed by the Governor.

South Carolina—Elected by the people.

South Dakota—Elected by the people.

Tennessee—Elected by the people.

Texas—Elected by the people.

Vermont—Appointed by the Governor.

Virginia—Chosen by the Legislature.

Wisconsin—Elected by the people.

It will be seen that in sixteen States Commissioners are elected by the people; in 12 they are appointed by the Governor, and 13 have no Commissioners at all.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The Treasury returns to the end of the last fiscal year, which were made public a few weeks ago, showed locomotive exports for the year to the value of $3,258,000. The year before, the locomotives sent abroad amounted in value to $4,039,000; and in 1900 the total value was $5,592,000. The average price, which we arrive at by dividing the figures just given by the number of locomotives sent abroad in each of those years, was $8,900 in 1902, $9,500 in 1901, and $10,650 in 1900. It is at once obvious that as we do not know the average weight of the locomotives we cannot compare these average prices; but it seems quite apparent that high prices at home and the great domestic demand have had their effect in the exports of locomotives as well as of all other railroad material. The exports of rails, for instance, fell off very greatly from 1901 to 1902; that is, in 1901 the value of rails exported was $10,841,000; in 1902 it was $4,614,000. In these amounts the exports to British America and to Mexico, of course, count for much more than to any other countries. The exports of cars for steam railroads were valued at $3,018,000 in 1902 and $4,195,000 in 1901. Cars for all other railroads were exported to the value of $789,000 in 1902 and $1,420,000 in 1901.

Freight Congestion and Demurrage Bills.

A certain lumber concern which has much lumber shipped direct from point of manufacture to its customers, states that never before has it found it so expensive to do business; and this is largely owing to the slowness with which freight is handled by the railroads.

With cars on the road from two to eight weeks an amount of capital is tied up which results in financial stringency. For example, July 15 last it had $100,000 invested in lumber, bought and shipped during June, to be paid for on the 15th of July, which at the last date was still in transit. This concern has no fault to find about the car supply; at present there is a good supply of empties; but motive power is short. There will be a long string of cars on a side track near a mill, but it takes days to get them set in to the loading track and then days more to get them pulled out; and then they are weeks on the road.

It would seem that after several years of steadily growing business the railroads should be in a position to handle traffic with reasonable dispatch. They are in this condition as far as cars are concerned, but they have not the ability to move the cars. In face of this fact the ordinary car service rules seem to be applied oftentimes with unnecessary severity. The man who wants a carload of lumber in a hurry will find the railroad delaying delivery of an empty to the shipper for days, delay pulling the mill track for other days and then keep the car in transit two or three times as long as should be necessary, perhaps have the car at his station three or four days before it will be set into the yard track, and yet want to collect demurrage because the consignee has not unloaded the car in forty-eight hours. There ought to be some reciprocity about this car service business. If there be an obligation on the part of consignors or consignees to load and unload promptly there is also a corresponding obligation on the part of the railroad to furnish and move cars promptly. There is a growing sentiment in the lumber trade in favor of a penalty against the railroads for failure properly to perform their public duty. . . .—*American Lumberman.*

The foregoing item represents only a single case, and we have no means of knowing to what extent it is a representative case; but it is safe to conclude, if on no other evidence than that of numerous and undisputed newspaper accounts, that congestion of freight traffic, causing delays, occurs frequently in many places; and therefore we have thought it proper to reprint the item. And everybody is expecting a constant increase in freight movement, up to the limit of the capacity of cars and engines, for many weeks to come; so that if there is anything to do about the complaint, the present is a good time to consider the questions which it brings up.

In the first place, however, we want to congratulate the railroads on this evidence, in the *American Lumberman*, that cars are now plenty. We assume that this improvement is due to the adoption, on July 1, of per diem payments for borrowed cars. We recognize, of course, that such an assumption is only an assumption, but there is a good deal of other testimony to the same effect.

The questions raised by the lumber shippers' complaint are few, but very hard to answer. From our standpoint, or from that of the *American Lumberman*, there are only two: (1) are the railroads doing all they can to expedite the movement of freight; (2) would the shippers or consignees reap any advantage from a "reciprocity" rule requiring the railroads to pay a per diem penalty for slow movement? We think it safe to say that every railroad is increasing its locomotive power, and the corresponding facilities in other directions, as fast as it dares to; but how fast you will dare to move depends on such elusive factors that no one who has not made a detailed study of the particular road or roads complained of, can even begin to answer the question. How many months out of every 12 will the new engines have to stand idle? Keeping in mind this same question of probable partial idleness, how many new trainmen is it expedient to employ? The temptation is to get along with your present force, working the men long hours. With the high requirements necessitated by the rising standards of safety, the employment of new men, even after you have got your new engines, is a grave question, and there are good reasons for employing a minimum number.

What is the prospect of remunerative rates on lumber, next year, and the year after? What is to be expected from those competing railroads which are liable to cut rates to unreasonably low figures? How much interest money must be paid on the new yards, side tracks and other permanent investments which an enlarged business will make necessary? Questions like these often have to be decided mostly by opinion rather than by facts; and it is only the part of business prudence for the railroad manager to take all reasonable measures to spread the traffic of the heavy months over into the light months and thus avoid any unnecessary increase in his plant. But in doing this he will, of course, produce some congestion.

For our second question, we doubt whether there is a satisfactory answer. The proposition has been broached many times, but we have never heard that anything came of it. In one of the Southern States the rule requiring railroads to make the consignee an allowance for delay is, we believe, incorporated in the State regulations, but it applies only to yard service, and we have not heard that it does anybody any good. If a railroad were bound by a money penalty to carry lumber without delay, the obvious duty of the road would be to refuse to receive the lumber from the shipper until there was a reasonable certainty of freedom from blockades, and this course would often be as objectionable to the shipper as to the railroad company. He would often, if not always, be glad to waive his right to the penalty, for the sake of getting his car started on its journey, even with a chance of delay. The rule would be as impracticable as the rule, which has often been suggested, of refusing to admit passengers to a street car when the seats are all filled. If a railroad, bound by a money penalty, refuses to receive a car of lumber because it anticipates a blockade, the only course open to the shipper is to go into the courts and try to compel the road to furnish more cars, engines, tracks, yards or men; and the shipper then finds himself confronted by the difficult transportation problems that we have outlined above; and he has the added difficulty of having to support his arguments by legal proof.

The Railroads of India.

The report of the Government of India on the Indian railroads, for the calendar year 1901, is just issued. It bears date of April 30, and some of the information is later than the end of last year. During the year 576 miles of line was added to the system, bringing the total mileage opened up to 25,373 miles. Over 14,000 miles of this is the Indian standard gage, namely, 5 ft. 6 in.; 10,500 is meter gage and the rest is various narrow gages. Steam tramways running outside of municipal limits, are included in these figures, being treated now as "light railways."

The system, as a whole, appears to be in a prosperous condition. In the year 1900, for the first time since the commencement of railroads in India, there was a surplus to the State, of revenue over expenditure, which amounted to nearly 8¾ lakhs of rupees. In the year 1901 the surplus amounted to over 115 lakhs of rupees. The lakh, as the reader doubtless knows, is 100,000, and using 32½ cents as the value of the rupee, the surplus in 1901 amounted to $3,738,000. The 1900 increase in business was to a considerable degree due to the great movement of relief material for the famine; but in 1901 the famine conditions were confined to a small area and the increase was mostly due to the natural development of the system. This profit is after charging off not only working expenses and interest on the total outlay, but also interest on capital expenditure on lines building, from which no revenue is yet received.

The gross revenue amounted to about $100,000,000; the working expenses amounted to about $47,780,000. The other charges against revenue were almost entirely interest, leaving the balance of 11,541,198 rupees, as above.

The outlay on construction for the year was 101,641,000 rupees (in round figures $33,000,000) on 2,363 miles of road. This included not only money spent for building, but also for additional rolling stock and other facilities. The increase of rolling stock was 223 engines, 563 passenger vehicles and 4,695 freight cars.

For the official year 1902-3, provision has been made for a capital expenditure on railroads of 110,000,000 rupees ($35,750,000), for which the State finds the funds either by direct payment or by guarantee. So we see that there will be immediate demand for great quantities of material and machinery.

The passengers carried in 1901 numbered 194¾ millions, exclusive of season ticket-holders. The "season and vendors' tickets" numbered 14,726, which may have represented a million trips, or may have represented more or less; of that we cannot judge. But it is safe for comparison with the United States to put the total Indian passengers at 195 million. In the United States, in 1900 (figures for 1901 are not yet available), the total passengers were 576,865,230 millions. These figures at once suggest the great density of Indian passenger traffic as compared with ours. This will be clearer when we examine the passenger-miles. In India in 1901 the passenger miles were 7,868 million, or about 314,700 per mile of line worked. (The report does not give average miles worked for the year.) In the United States in 1900 the passenger-miles were 16,039 million, or 83,295 per mile worked. The average fare received in India was 0.416 cent per passenger-mile; in the United States, 2.003 cents. Obviously the social conditions in the two countries are so absolutely different that such comparisons have little value, and, indeed, would be misleading were we to try to reason from one to the other. We have often, in years past, pointed out the conditions which make such rates possible.

In freight traffic we find quite different conditions. The ton-miles carried in India in 1901 amounted to a little less than 7,063 millions; in the United States, in 1900, the ton-miles were 141,599 millions. Per mile of road worked, the freight traffic in India amounted to 282,510 ton-miles; in the United States 735,366. That is, in spite of the enormously greater population per mile of road in India and the far greater passenger traffic per mile of road, our freight traffic exceeded in density that of India 2.6 times. And here the figures of rates are also reversed. The average rate per ton-mile in India was 0.978 cents; in the United States it was 0.729 cents.

The coal and coke traffic in India increased materially in the year 1901, having amounted to 8,272,000 tons; the year before it was 6,631,000 tons. This increase was largely because of the high price of English coal. It is expected that a reduction in the price of English coal (which must naturally follow the close of the war in South Africa), together with the introduction of patent fuel, will check somewhat the output of coal in India. Already English coal has re-

turned to compete with Indian coal in the Indian markets. Ten years ago the total coal mined in India was 2,328,577 tons; in 1901 it was 6,657,573.

Naturally, the report cannot pass over the much debated matter of a provision of locomotives for India. Owing to the difficulty in getting reasonably early deliveries of locomotives ordered in England, a general conference of Locomotive Superintendents was called to make recommendations for standardizing the locomotives for all gages of the Indian railroads. This Commission met at Calcutta last December and said that a fixed scale of standard dimensions, weights, loads and working stresses is essential and should be prescribed by the government; a higher standard of loads should be settled upon and accepted; English locomotive builders who have suggested standardization in locomotive specifications should be invited to help in preparing a set of standard designs, with a view to decreased cost and quicker delivery. Finally, in order to maintain the standards eventually reached, a committee of Locomotive and Carriage Superintendents should be organized by the Government and by the companies, as the tribunal for maintaining or relaxing the standards from time to time.

Annual Reports.

Chicago & North Western.—The annual report of this company for the year ended May 31, 1902, has just been issued in pamphlet form and shows an earning capacity quite unapproached by any of the other railroads west of Chicago. On gross receipts of $46,644,121 (increase in the year, $3,545,534), the company reports a balance of income after operating expenses and all interest charges of $10,575,000, or equal to over 17 per cent. on the total outstanding preferred and common shares, amounting to about $61,500,000. These results were on an average of 5,760 miles worked in the year, as against 5,507 average miles in 1901. Increased mileage, therefore, accounts only in relatively small part for the large enhancement of earning capacity which may be referred to the large spring wheat crop grown in the company's territory last year and bountiful harvests in other sections, as well as great increases in local business and passenger travel. Gross earnings per mile have risen to $8,098 for 1902, as against $7,826 in 1901, and as compared with $5,587 in 1895, when the low record of revenues per mile was made. In this period the net earnings per mile, after expenses and taxes were paid, have risen from $1,908 in 1895 to $2,889 in 1902. There is a change of only $3 in net earnings per mile as compared with 1901, while the high figure is the $3,058 reported in 1900.

Operating expenses absorbed $2,776,000 of the increased revenues of the past year, as will be seen by the following statement of the income account in the past two years:

	1902.	1901.	Increase.
Aver. miles oper.	5,760	5,507	253
Pass. earnings	$10,886,139	$9,718,191	$1,167,948
Freight earnings	33,436,892	31,364,945	2,071,947
Total gross	46,644,121	43,098,587	3,545,534
Oper. expenses	28,596,401	25,851,689	2,744,712
Expenses and taxes	30,005,643	27,229,998	2,775,645
P. c. exp. to gross	64.33	63.18	1.15
Net earnings	$16,638,479	$15,868,589	$769,890
Net interest charges	6,406,038	6,324,752	81,286
Sinking funds	225,120	225,000	500
Interest advanced	9,195	74,630	Dec. 65,435
Total charges	$6,640,734	$6,624,382	$16,352
Total net income	10,514,825	9,821,287	693,538
Dividends	4,529,468	3,914,394	615,074
Surplus	$5,985,357	$5,906,893	$78,464
Improvements, etc.	4,697,055	4,169,526	$527,529

The increase in mileage in the past year includes the Sioux City & Pacific, which was formally taken over by the Chicago & North Western in the year after the foreclosure sale under the government lien, the company having been previously separately operated, although long controlled by the North Western. In addition a number of branch roads, the Peoria & North Western giving the company a line into Peoria, Ill., and the Princeton & North Western a branch into Wisconsin, and other new construction, account for the increased mileage, and on May 31 last the company operated 5,891 miles, exclusive of certain joint leased lines and trackage rights, as against 5,577 miles on May 31, 1901. Besides this new railroad constructed and taken over the company has laid much additional track in extending its second track and sidings. In fact, one of the important events of the past year was the completion of the company's continuous second track line between Chicago and the Missouri River at Council Bluffs, Ia.—a distance of 490 miles—by completing a section of 67 miles in Iowa. The company has now 797 miles of double track on three main lines, giving it a double track road on the north from Chicago to a point beyond Milwaukee; on the northwest from Chicago to a connection with the Omaha Railway, and on the west to the Missouri River. Including over 2,120 miles of sidings and yard tracks, the company operates 8,870 miles of track.

Of the enhanced earnings of the past year $2,072,000 was contributed by the freight department. Passenger earnings last year increased by $1,167,900, or 12½ per cent., as against a gain of $715,500, or about 8 per cent., in the previous year. The tons of freight carried show an increase of 16 per cent., and the tons one mile an increase of 11⅛ per cent. There was a small reduction in the average ton-mile rate, bringing this figure also below the average for 1900, or to 8.1 mills, as against 8.5 mills in 1901 and 8.3 mills in 1900. Earnings per freight-train mile, however, were $2.03, as against $1.98 in the previous year, the increase in mileage of freight trains being only 3⅜ per cent. Figures of the traffic movement for the last three years are shown below:

	1902.	1901.	1900.
Pass. carried	18,648,850	16,944,370	16,637,840
Pass. one mile	541,676,120	483,273,250	454,614,457
Pass. train-miles	13,830,280	12,186,570	11,419,800
Tons carried	29,321,540	25,271,720	25,442,220
Tons one mile (000 omitted)	4,122,441	3,701,418	3,849,368
Freight train-miles	16,512,620	15,928,980	16,341,995
Ton-mile rev., cts.	.81	.85	.83
Aver. freight haul	141	146	151
Pass. mile rev., cts.	2.01	2.01	1.98
Aver. pass. journey	29.1	28.5	27.3

Maintenance of way charges were 21⅓ per cent. of the total operating expenses of the company and they included the cost, not only of liberal repairs and renewals, but of a great amount of new work. Equipment charges likewise included cost of new and additional rolling stock.

These heavy maintenance charges and the cost of the new freight equipment built and charged against cost of maintenance of equipment, are entirely separate from the very heavy appropriations made in the last few years out of surplus income for new road and improvements, permanent additions and additional equipment. In the last three years these have amounted to an aggregate of $13,408,000, and allowing for $5,000,000 written off accumulated surplus in 1899, the appropriations of income for improvements in the last four years are brought up to a total of $18,000,000, a sum considerably in excess of the total dividends paid in the period. Of this amount $497,000 of the appropriation in 1902 and $1,108,000 of the 1901 appropriation was for new railroad built.

With the expansion of this system going on as rapidly as is indicated by the growth in mileage from 5,077 miles on May 31, 1899, to 5,891 miles on May 31 last, and with the extraordinary improvements, there continue to be relatively heavy charges on construction account. The total of these in 1902 was $13,898,660, of which $4,697,055 was carried as the special appropriation against income, leaving $9,201,604 as the net charge to construction, as the result of the year's development. But this did not represent increase in bonded debt altogether. Changes in that account show redemption of $794,000 bonds, through maturity, sinking funds and refunding exchanges, and issue of $10,115,500 new bonds, a net increase of $9,321,500. But $1,000,000 of these new bonds issued for construction are held in the treasury unsold, while only $256,000 treasury securities were sold in the year. This leaves $4,838,000 par value of the company's bonds held in the treasury, unsold, at the end of the year, an increase of $1,039,000. The bonds issued were $2,100,000 for the Princeton & North Western of 100 miles, $2,125,000 for the Peoria & North Western Ry. of 85 miles, and $4,000,000 for the Sioux City & Pacific R. R. of about 127 miles. The total charge of $13,898,660 against construction is made up of the following items, the proportion of the cost charged off against income being also shown:

	Total charge.	Paid out of income.
Second main tracks	$1,463,242	$730,937
Chicago track elevation	361,453	361,453
Additional equipment	1,036,237	1,036,237
Other permanent improvements	2,342,629	2,071,076
New roads	8,695,100	497,304
Total	$13,898,661	$4,697,055

In addition to this appropriation of income, the $1,000,000 bonds issued for improvements and second tracks are held unsold, as stated above, so that capital funds were used only for additional mileage.

Buffalo, Rochester & Pittsburgh.—This company's traffic and earnings increased largely in the fiscal year to June 30, 1902, for which the annual report is now at hand, continuing the prosperity which the company has shown in recent years in common with all the other carriers of soft coal. The company's coal traffic originates in Clearfield and adjacent coal fields in Western Pennsylvania, and it has transportation routes out of this coal field on the north to Buffalo and Rochester, on the west to Butler, Pa., and thence by trackage rights into Pittsburgh, and also on the north to Newcastle, with a connection thence to the west. In the past year, while there has been no increase in main line or leased line mileage, there were under construction at the close of the fiscal year 46 miles of new line through the coal fields, and trackage rights over the Pennsylvania Railroad, extending this branch 20 miles further to Vintondale on that line, had been arranged. In the past year also the company, by a contract with the New York Central Railroad, secured trackage rights for 25 years over an extension of the Beech Creek Railroad from Clearfield to Keating, Pennsylvania, and to a connection with the Philadelphia & Reading, giving a new outlet to the south for soft coal. At the close of the fiscal year the company worked 472 miles of road.

On this mileage gross earnings last year were $6,313,246, an increase of $482,628 over the previous year. The report gives very full statistics and an itemized account shows that coal and coke revenues together contributed $3,711,368 of the total freight receipts of $5,362,553, and accounted for $245,795 out of the increase of $356,286 in freight receipts. Merchandise revenue amounted to $1,415,810, or $97,431 more than in 1900. The comparative income account for the last two years is shown in the following statement:

	1902.	1901.	Increase.
Gross earnings	$6,313,246	$5,830,618	$482,627
Operating expenses	3,632,004	3,277,176	354,828
Income	$2,681,241	$2,553,441	$127,799
Interest, taxes, rentals and sinking funds	1,406,976	1,338,003	68,972
Net income	$1,274,264	$1,215,438	$58,826
Extraordinary expenses and construction and equipment	583,561	530,134	53,427
Surplus	$690,703	$685,304	$5,399
Dividends	600,000	480,000	120,000

In 1894 gross receipts were $8,392 per mile, and in 1902 $13,375 per mile, an increase in seven years of about 60 per cent. The increase in net earnings per mile, after deducting taxes and extraordinary improvements, has been $2,236, to a total of $4,228 in 1902. This gain in earning capacity was secured with an increase of only $525 per mile in fixed charges to a total of $2,764; so that whereas there was a deficit of $235 per mile in 1894, last year's earnings show a profit of $1,464. They were large enough to enable the company to pay 6 per cent. on $6,000,000 preferred stock, and 4 per cent. on $6,000,000 common stock, as against 4 per cent. in 1901, and still have a surplus of $674,000, making no allowance for the $100,000 received as a dividend of 2½ per cent. on the company's holdings of $4,000,000 Rochester & Pittsburgh Coal & Iron Company's stock, which conducts the coal mining operations of the railroad company.

This surplus enabled the company to appropriate $580,562 for construction and equipment expenditures, $530,134 having been appropriated under like heads in 1900, and smaller amounts in previous years. Except for small amounts spent by leased roads, all construction charges on the system in the past several years have been met by these appropriations from net income. In addition to this special appropriation from income the company charged $220,271 for construction expenditures against the profit and loss surplus. Of the appropriation out of income $128,000 was in reduction of car trusts and out of the total of $636,271 for construction expenditures, which includes the charge to profit and loss; $305,829 were for the building and equipping the new locomotive shops at Dubois, Pa. This sum was in addition to the $156,500 appropriated in 1901 for the shops, and brings their total cost up to $462,300, the estimated cost given in the 1901 report having been $370,000. For second track, sidings and yard extensions $180,000 additional was spent in 1902, and the other items of the construction expenditures included new bridge work, land damages, buildings, etc.

For new equipment $905,583 was spent; $212,753 for 14 new locomotives, the net increase in inventory account being eight engines; $684,960 was for 825 freight cars, of which 753 cars appear to have been additional rolling stock. Allowing for the $128,000 equipment trusts and $77,100 equipment sinking funds paid off and the value of the equipment sold or destroyed, the net addition to equipment capital account last year was $601,301.

Since 1894 the number of tons carried and the ton mileage have each much more than doubled. Increase in the coal business, of course, has furnished far the greater portion of this gain in traffic, although the increases in general traffic and in passenger movement have each been large. Thus, from a total of 16,133,300 passenger miles run in 1894 travel had grown to a total of 41,500,000 passenger miles in 1902, an increase of nearly 160 per cent. Freight statistics show an increase between these years of 2,760,000 in tons of bituminous coal moved, exclusive of coke, the increase in this traffic being 50 per cent. larger than the total tons of soft coal moved in 1894. The freight statistics show other striking gains in traffic movement also, such as an increase in manufactures from 98,500 tons in 1894 to 521,000 tons in 1902; increase in forest products from 248,800 tons to 315,000 tons; an increase in agricultural products from 111,000 to 159,000 tons; and a decrease in tons of salt moved from 159,000 to 64,700 tons in 1902.

Cleveland, Cincinnati, Chicago & St. Louis.—A majority of the outstanding common stock of this company is now held in the treasury of the Lake Shore & Michigan Southern Railway, but it is still operated as an independent property under its own organization. The report for the 12 months to June 30 last shows continued large gains in revenues, despite the heavy loss in the corn crop. The loss in tonnage of corn and oats as compared with 1900 is placed at over half a million tons, with a probable loss in revenue of three-quarters of a million dollars. This tonnage and revenue was made up again chiefly by movement of coal, iron and building materials, but the larger business was done at a decrease in the average ton mile revenue, which, after steady declines for a number of years, had shown increases in the previous two years. The larger tonnage of the year yielded $611,542 increased revenues, but the lower rates caused a loss of $331,449; so that the net increase in freight earnings was $280,094, or 2.4 per cent. This compares with $772,500 increased freight earnings in 1900, when $507,236 was attributed by the higher rates and only $265,264 by the larger tonnage. Passenger rates also fell off in 1902, this being on account of the large excursion travel to the Buffalo Exposition; but the increase in passenger revenues was still unusually large, being $507,855.

With an increase of $840,000 in gross receipts there was an actual loss of $149,000 in net earnings attribut-

able to the continuance of the policy, which has been marked both in 1900 and 1901, of carrying out heavy improvement work by charges against expenses as well as by large special appropriations out of the surplus balance. These improvement charges in 1902 were $600,371, as against $567,852 in 1901, and after paying the regular 5 per cent. dividend on the preferred stock, and 4 per cent. on the common stock, as against 3½ per cent. paid in the previous year, the surplus balance was but $30,973, bringing the accumulated profit and loss balance up to $1,438,681. This small surplus, or the balance of $1,650,489, allowing for the dividend payments, was on gross earnings of $18,717,071, the working charges and taxes alone accounting for 73.3 per cent. of this amount, as against 71⅛ per cent. in 1901. The following comparative statement shows the income for the last two years, and also for 1897, since which year the company's revenues and traffic have steadily increased:

	1902.	1901.	1897.
Gross earnings.....	$18,717,071	$17,877,489	$13,117,111
Oper. exp. and taxes...	13,744,920	12,755,638	9,864,664
Net earnings	$4,972,151	$5,121,851	$3,252,447
Interest and rentals...	2,799,651	2,916,963	2,883,926
Balance	$2,172,500	$2,204,888	$368,521
Dividends	1,619,516	1,479,626	375,000
Special approp.	600,371	567,852	.....
Surplus	$30,973	$285,065	Def. $6,479

Thus in five years since 1897, gross receipts increased $5,600,000, of which only $1,720,000 appear in net earnings. Out of the larger earnings the company has spent $2,075,000 in increased maintenance cost. The last few reports have itemized the cost of the work which has chiefly contributed to the larger maintenance expenses. It may be pointed out that in the last three years alone the company's charges against current income either directly against operating expenses or against the surplus balance of the year for new equipment and extraordinary improvements of one kind or another, have amounted to $4,141,000. Of this amount $1,603,734—the largest of the three years—is to be credited to the 1902 accounts. This large sum was specifically divided; $600,371 as a charge against surplus income, the balance being included in the operating expenses. The largest item in this latter division was $355,000 for building 57 miles of side track; and $630,650 for 17 engines, 180 freight cars and 26 passenger cars. The appropriation out of surplus account included $218,700 for 22 miles of new double-track on the Cleveland Division; $159,400 for over 11 miles of new track; Linndale yard improvements near Cleveland, and $222,200 part payment for 2,800 new freight cars. Altogether 90 miles of track built during the year, 113 miles of 80-lb. rails laid to replace lighter section, 300,000 yds. of ballasting, and 7,136 lineal ft. of stone and iron bridge work to replace wooden structures, were charged against earnings of the year.

With all this work, there has been an actual decrease in the capital account through a credit for a premium received in sale of new bonds issued for refunding purposes, and this same operation has resulted in the decrease in interest charges. Other changes in the capital account were connected with the acquisition of the Cincinnati & Northern Railroad, which has cost $1,091,955; and the purchase of the 2,800 freight cars above alluded to, on which the unpaid purchase price, $1,372,147, is carried in a special account.

Changes in the traffic movement of the year show an increase of 8 per cent. in ton miles and of 12.7 per cent. in passenger miles. In each case the irregular nature of the larger business bringing this additional revenue did not permit economical train handling, and with the increased movement of cars necessitated, together with the drop in the average rates, both freight and passenger train mile earnings show a decrease as compared with 1900. The principal changes in the traffic statistics of the year, and also those for 1897, appear in the following statement:

	1902.	1901.	1897.
Tons moved	12,056,980	11,098,300	8,223,347
Pass. carried	5,685,677	5,542,100	4,937,250
Tons 1 mile.....	2,012,387,500	1,909,086,400	1,343,484,900
Pass. 1 mile.....	292,346,300	259,259,130	186,657,170
Loaded frt. car miles	131,763,760	127,850,900	112,580,370
Empty frt. car miles	34,240,494	35,070,524	35,661,670
P. c. empty miles.	20.6	21.5	24.0
Frt. train miles..	6,057,830	5,741,380	5,442,060
Pass. train miles.	5,499,947	5,207,002	4,922,580
Freight car load (tons)	15.27	14.93	11.93
Aver. rev. train load (tons) ...	332	333	247
Aver. frt. train haul (miles)...	167	172	163
Ton-mile rev., cts.	.592	.610	.614
Frt. train-mile rev.	$1.97	$2.03	$1.52

The cost of carrying traffic was further increased last year on account of the higher charges for fuel and the increased wages paid. The total increase in conducting transportation was 9.4 per cent., the largest increase in any one item being $109,857 in locomotive fuel, or about 8⅓ per cent. over 1900. Wages of engineers, enginemen and trainmen were also about $144,300 higher, and the total increase in the cost of conducting transportation was $562,327 in addition to $48,789 increase in traffic expenses, as will be seen by the following summary of the operating expenses of the year:

	1902.	1901.	Increase or decrease.
Main. of equip.....	$2,828,868	$2,589,564	$239,304
Main. of way.....	2,513,658	2,263,379	250,279
Conduct. transp.....	6,526,633	5,964,306	562,327
Traffic expenses	604,820	556,032	48,788
General	331,631	333,043	Dec. 1,412
Car service	273,648	410,326	Dec. 136,678
Insurance	31,286	26,043	5,243
Taxes	634,376	612,945	21,431
Total expenses.....	$13,744,920	$12,755,638	$989,282

In a report of the Massachusetts Railroad Commission on certain collisions on single track street car lines it is stated that one of the causes of butting collisions was misunderstanding or inaccuracy of despatcher's orders, which are generally transmitted by telephone. An instance cited is the case of a collision on the Brockton and Plymouth street railway at Hanson, where the fact was revealed that the orders which were sent over the telephone to the respective motormen were not identical, or at least that one motorman's understanding of them was entirely different from that of the other. The despatcher insisted that the two orders sent by him were alike, but as no record of them was kept it was impossible to determine the truth of the matter. The newspaper from which we copy this statement suggests that it may be found necessary or desirable to abandon the use of the telephone for the transmission of orders. Whether or not the State Railroad Commissioners countenance this idea we do not know; but as we do know that some railroad officers—perhaps a good many—regard the telephone with distrust, we quote this item for the purpose of quoting along with it the statement that the Pennsylvania Railroad uses the telephone for despatching, with success. It is not surprising to find distrust of the accuracy of the telephone, for everybody has had experience with its deficiencies; but this is a matter in which experience is a good guide. The Illinois Central has also reported satisfactory results from telephone despatching and other roads have testified to limited experience in the same direction. The experience of Mr. C. A. Hammond, who has written in the *Railroad Gazette* of his telephone despatching is also important, because he gives a circumstantial account of the way in which he met the difficulties of the situation on his road. On the Pennsylvania telephone despatching is now an old story, some of the branches—and branches of considerable length—having been thus operated for six or eight years. And the Pennsylvania is a road whose conservatism is never suspected.

As the reader of course knows, the railroad reached Khartoum a good while ago, giving railroad communication from the Mediterranean to Khartoum, except a few miles from just above the first cataract to Wady Halfa, where there is a stretch of good river navigation. A French journal now says that a British company is going to build a railroad from the Nile, above Khartoum, to El Obeid, the capital of Kordofan. We do not attach much importance to this rumor, having seen little of it in any of the English papers, and yet it is not at all impossible. There is good navigation along the Nile from Khartoum south, and a railroad leaving the Nile immediately opposite Khartoum, or from any point within 50 miles of Khartoum, could be carried to El Obeid in 225 miles, across a perfectly easy country. A great amount of gum arabic would be brought out, and there would be some movement of grain and a little movement of general merchandise. It is impossible, however, that such a railroad could do more than pay very moderate working expenses and perhaps a little interest on the investment.

The Electrifying of the Mersey Tunnel.

The last of the main generators and engines intended to be installed in the power plant of the Mersey Tunnel Railway are about to be shipped from the Westinghouse Works at East Pittsburgh. These generators are of the railroad type (1,200 K.W., 650 volts, 90 revolutions per minute) and are to be direct connected to vertical cross-compound Westinghouse Corliss engines of 1,500 h.-p. each. The power-house lighting and the electric light of all stations, sidings, etc., will be supplied from a separate generating plant. The power generating plant will have an aggregate output of about 6,600 h.-p.—6,000 h.-p. for the railroad proper, and 600 h.-p. for lighting. The Westinghouse electro-pneumatic system of train control is to be used and the cars will be equipped with Westinghouse high-speed air-brakes. The rolling stock will consist of 60 cars. The trains will be formed of five cars each, the first and last cars of a train being motor-cars equipped with four 100 h.-p. motors each.

The Mersey Railway connects Liverpool and Birkenhead, and passes under the river Mersey. The railroad is about four miles and a half long, the total length of track, including sidings, being about 12 miles. The passengers carried amount to between seven and eight millions a year with the steam locomotive system.

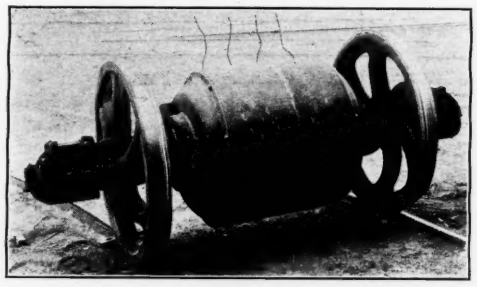
The line is to be fitted with the third rail, the conductor rail to be laid alongside and just outside of the running track. The running rails will not be used as the return electrical conductor, but a fourth rail is to be placed between them solely for this purpose. This will prevent destruction of the track rails or buried pipes in the vicinity by electrolytic action. The third and fourth rails will be similar in size and in arrangement. They are to be of T-section, 60 ft. in length, and to weigh 100 lbs. per yard. They will be bonded and carried on stoneware insulators spaced at intervals of 7 or 8 ft.

It is expected that the trains will run on a three-minute service. The tunnel and the seven stations of the system are to be electrically lighted throughout. The power generating station, the machinery and the track work are all being pushed rapidly to completion.

A New Axle Light System.

The Chicago & Alton has announced that it will put in use the Henry system of electric train lighting from the axle. This system is the invention of the late John C. Henry, a well-known electric railroad inventor, and was perfected by him only a very short time before his death. It is now being put on the market by the Henry Electric Equipment Company, of Denver, of which Mr. C. F. Elliott is President and General Manager. The Chicago & Alton has recently been subjecting the system to examination and test; car 503, the private car of the General Superintendent having been equipped for the purpose, has been run over the Alton system at all speeds and an endeavor made to cover all possible service conditions.

The apparatus used in this test is the first built by the company and is shown in the accompanying illustrations, the motor mounted on the wheels and axle of a street car. The Alton has made arrangements to build



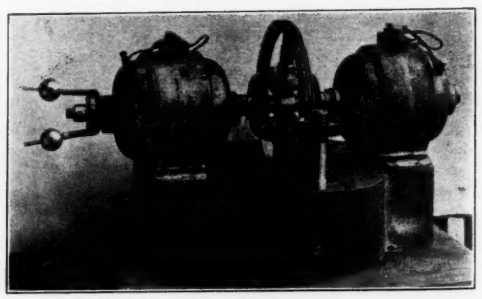
Henry Axle Light Generator.

the equipment for its cars at its Bloomington shops, the Henry company not yet being in shape for its manufacture.

Briefly described the system consists of a generator, a combined voltage regulator and circuit controller, and a storage battery. The generator is mounted directly upon the axle, the latter becoming the armature shaft, and thus doing away with belts, chains or gearing. The pole arrangement is such as to give the required voltage at a very low speed, this being necessary on account of the direct connection. The motor is enclosed in a dust-proof casing.

In designing the regulator and circuit controller Mr. Henry endeavored to use the simplest possible electro-mechanical plan. Referring to the engraving, this device consists of two small motors, one of which, the one on the left, is in circuit with the generator, and the other with the battery. They run in opposite directions, and as long as the speeds are equal the worm remains stationary. When the speed of the generator motor increases or diminishes (the speed of the battery motor remains constant) the effect is to cause motion of the worm in one direction or the other, depending upon which motor speed predominates. Motion of the worm operates the small gear with which it meshes, which latter operates to cut resistance into or out of the dynamo field circuit, as may be required.

The battery used is the chloride accumulator type. When the car is standing, or running at slow speed, the lights are carried by the battery. When the train reaches a predetermined speed, which may be adjusted



Voltage Regulator and Circuit Controller.

anywhere from 18 to 40 miles an hour, the lights and battery are both thrown onto the generator circuit and power is supplied to the lights, while at the same time the battery is being recharged. Slowing down of the train below the set speed causes the lights to be thrown back onto the battery circuit.

The generator, it is claimed, requires very little attention, all that is necessary being lubrication and occasional changing of the brushes, which may be done in a very few minutes. It is intended that when the system is adjusted for service it will require no attention whatever from the train crew, all of its action being automatic.

The installation of the system on car 503 was of the most temporary character as regards wiring and connections, and having proved sufficiently satisfactory under these conditions, it is safe to assume that a more permanent and careful installation will be correspondingly more satisfactory. As has already been mentioned, the generator used on the test was the first one ever built. Those being made at the Bloomington shops will have a number of improvements over this first type, and the Henry company is also contemplating certain improvements to the regulator and circuit controller. We hope to be able to give soon a detailed description of this system and apparatus.

British Railroads.

The following tables from the Board of Trade report for the half year ended June 30, show the present situation. It will be seen that working costs are continually on the increase, and this together with the competition from electric tramways in the neighborhood of larger towns and cities, has led to much talk recently about electrification projects. But while all English railroads are watching electric traction there is little disposition to do anything hurriedly. Some of the boards have despatched representatives to America to watch developments, and there is a suggestion for several of the companies to join hands in an experiment in the Liverpool district.

	1901.	1900.	1891.	1881.
Lines open for traffic, miles	22,078	21,855	20,191	18,175
Capital authorized*	£1,322,489	£1,302,674	£1,036,512	£831,127
Capital paid up*	1,195,564	1,176,002	919,425	745,528
Pass. receipts*	46,630	45,384	35,131	27,462
Per cent. of total	43.76	43.30	42.92	41.26
Goods receipts*	52,966	53,471	43,231	36,447
Per cent. of total	49.71	51.02	52.81	54.76
Total traffic receipts*	99,595	98,855	78,362	63,908
Receipts per mile	4,511	4,523	3,881	3,516
Misc. income*	6,963	5,947	3,498	2,649
Total earnings from all sources*	106,559	104,802	81,861	66,557
Working exp.*	67,490	64,744	45,145	34,603
Per ct. of receipts	63	62	55	52
Net revenue*	39,069	40,058	36,732	31,955
Proportion to paid up capital, per cent	3.27	3.41	4.00	4.29
Passengers, exclusive of season-ticket holders, number*	1,172,396	1,142,276	845,464	623,048

*000 omitted.

Year.	Gross receipts.	Working expenses.	Net receipts.	Ratio net revenue to paid-up capital, p. c.	Ratio working expen. to gross income, p. c.
1901	£106,558,815	£67,489,739	£39,069,076	3.27	63
1895	85,922,702	47,876,637	38,046,065	3.80	56
1890	79,948,702	43,188,556	36,760,146	4.10	54
1885	69,555,774	36,787,957	32,767,817	4.02	53
1880	65,491,625	33,601,124	31,890,501	4.38	51
1870	45,078,143	21,715,525	23,362,618	4.41	48
1860	27,766,622	13,187,368	14,579,254	4.19	47
1850	13,204,669	.....	.....	....	..

TECHNICAL

Manufacturing and Business.

The Interstate Car Co., of Indianapolis, Ind., has been incorporated by Eugene H. Darrach, John Groff and others, and proposes to build a plant to make cars, locomotives, etc.

Charles L. Gately, formerly manager of the railroad department of the New York Belting & Packing Co., has taken a position as a representative of the Gold Car Heating & Lighting Co.

The firm of Collins & Norton, engineers, Springfield, Mass., has been dissolved, H. C. Collins retiring. Henry L. Norton will continue the business, representing the Fort Pitt Bridge Co., of Pittsburgh.

The Pittsburgh Valve & Fitting Company is building new works at Barberton, Ohio, and has placed a contract with the Westinghouse Electric & Mfg. Co. for the electrical equipment, which includes generators, motors and switchboards.

American locomotive gages and American locomotive pop safety valves, made by the American Steam Gage & Valve Mfg. Co., Jamaica Plain, Boston, Mass., have been specified for use on the 43 locomotives now being built for the Atchison, Topeka & Santa Fe by the Baldwin Locomotive Works.

The Consolidated Railway Electric Lighting & Equipment Co. (New York), has contracted with the Chicago, Rock Island & Pacific to equip with its "Axle Light" system of electric lights and fans all the cars now being built by the Pullman Company to be used in the new limited trains that go into service November 1st between Chicago and San Francisco via the Rock Island and the Southern Pacific.

Stamford Engine & Machine Co. was organized in New Jersey on Aug. 21, with Francis McFarlan as agent. The principal objects of the company are to carry on the business of mechanical engineers and dealers in and manufacturers of plants, engines and other machinery. The incorporators are Walter N. Lawson, William F. Ellis, Geo. C. Gammell, Samuel Hale, of Jersey City, N. J., and John V. Bouvier, Jr., of Nutley, N. J.

The Sunrise Mineral Paint Co., Detroit, Mich., incorporated some time since, is building a factory at Meridian, Mich., on the main line of the Pere Marquette, and expects to have it in operation this fall. The company has acquired a tract of 160 acres of land near Meridian which is of a somewhat rolling and peculiar honey-comb formation of an iron oxide nature, varying in depth from 3 to 10 ft., and said to contain sufficient raw material to supply the plant for 100 years, at double its initial output. It is claimed that the paint made from this oxide has withstood the severest tests in the most satisfactory manner and possesses unusual adhesive qualities. This latter will be an interesting point for users of mineral paint. The company is capitalized at $250,000, and the officers are P. A. Ducey, President; Samuel Herbert, Vice-President; George H. Irwin, Secretary and General Manager; H. S. Prince, Treasurer and Assistant Secretary; A. C. Stellwagen, Attorney and Counsel, all of Detroit.

Iron and Steel.

The Wabash recently placed contracts with the Carnegie Steel Co. for 25,000 tons of rails.

According to report, arrangements are being perfected for a combination of malleable iron foundries, with a capital of about $15,000,000.

The Jessop Steel Co., of England, is building a large steel plant at Washington, Pa., in which electrical power distribution will be employed, and has recently bought a considerable amount of direct current apparatus from the Westinghouse Electric & Mfg. Co.

Bids for Two Dams on the Drainage Canal.

The trustees of the Sanitary District of Chicago have set Oct. 15 on which they will open bids for building two dams in the Drainage Canal, one to be at Lockport and the other at Hickory Creek, Joliet.

The Quebec Bridge.

According to a recent despatch from Quebec work on building the piers for the large cantilever bridge over the St. Lawrence River at Chaudiere is progressing very favorably. The caisson on the south side has been sunk 35 ft. into the bed of the river, or 65 ft. below high water, and it will have to be sunk still further on account of the nature of the soil.

A Pontoon Bridge for Seattle.

Frank Borzone, of Ballard, Wash., proposes to build a bridge over Salmon Bay, the total length of which, including approaches, will be about 1,200 ft. During the construction of the Lake Washington Canal, connecting Lake Union and Salmon Bay, the bridge will consist of eight scows 20 x 50 x 5 ft., and four or six bridges 40 ft. long, one at each approach and the others between the scows. The bridge will rest on the bottom of the bay at low water. It will accommodate foot passengers and vehicles; also two or more standard gage tracks for railroad and street cars, the bridge being 60 ft. wide. The draw will be composed of two counter weight lift spans of 50 ft. each, allowing a clear opening of 100 ft. Each lift will rest on a strong scow, 60 x 100 x 6 ft., connected to trestle work. The deck of the bridge will be 20 ft. above water line.

German Studies of Fast Trains.

The German Society of Mechanical Engineers had offered a series of prizes for the best design and specifications for a steam locomotive and group of cars, which would collectively form an express train capable of carrying 100 passengers and their baggage with personal comfort and at a speed of 75 miles an hour. The purpose of this competition is to provide a unit of the equipment for greatly accelerated speed, which can be adapted to the present State railroads of Prussia. A forecast of the pending competition has been given by Mr. Kirchhoff, editor of a technical publication in Berlin, in which a description is given of certain features of the new locomotives, which are to be tested over the Berlin-Zossen line next year. The specifications require that this engine and train shall be able to maintain for three consecutive hours a speed of 120 kilometers (74.5 miles) an hour, without stopping for water or fuel. The locomotive will rest on 12 wheels, viz., two pairs of drivers at the middle of the machine, with a four-wheeled truck in front and rear. The engine will be compound with three cylinders, two connected outside, while the third, or high-pressure cylinder, will be connected inside.

A Corrugated Fire-box Locomotive in England.

The *Engineer* (London), August 15, contains illustrations and a description of a locomotive of the Lancashire & Yorkshire Railway recently fitted with a cylindrical, corrugated fire-box. This is an eight-coupled engine, all weight carried on the driving wheels. It is a freight engine, designed some time ago by Mr. J. A. F. Aspinall, now General Manager, but this individual engine has been fitted for experimental purposes with a cylindrical boiler designed by Mr. H. A. Hoy, who succeeded Mr. Aspinall as Locomotive Superintendent. This engine has a total heating surface of 2,017 sq. ft. The fire-box is 57 in. in diameter and 9 ft. 11½ in. long. The grate area is 33 sq. ft. The working pressure is 180 lbs. per sq. in. The writer in the *Engineer* sees no good reason why this type of boiler should not be used for fast passenger engines, while it has great advantages. The writer adds that if the experiments "do not falsify our anticipations, it will be worth while to sacrifice some prejudices and make a new departure in locomotive design."

Pintsch Gas in India.

The report on the Indian railways for the year 1901 says that during that year 1,091 vehicles were fitted for lighting with Pintsch gas. This makes the total so fitted up to the close of the year, 6,577. There is still 4,437 vehicles in passenger service not equipped to light with gas.

Some Washington Contracts.

In his annual report, Mr. W. A. McFarland, Superintendent of the Water Department of Washington, says that the new Trumbull street station, which is being built by the Geo. A. Fuller Company, is well under way. Contracts have been let to Westinghouse, Church, Kerr & Co. for steam generating equipment; to Pawling & Harnischfeger for 20-ton electric crane; to Michigan Brass & Iron Works for large water gates; to the United States Cast-Iron Pipe & Foundry Co. for flanged water-pipe specials; to the Allis-Chalmers Co. for new water end for eight-million-gallon pumping engine; to Henry Kampmann for coal storage pockets of 1,000 tons capacity, and to Johnson & Morton for switchboards. During the coming year contracts will be let for coal and ash-conveying machinery, elevators for storage rooms, steam heating and other equipment. During the ensuing year the building for the Trumbull station will also be completed, and 48-in. and 36-in. mains will be laid from it to Capitol Hill and to Thirteenth street and Florida avenue.

Contract for a Lighthouse Tender.

The U. S. Treasury Department has let a contract to the Spedden Shipbuilding Company, of Baltimore, for a new lighthouse tender, to be a combination tender and gas-carrying steamer with large tanks for charging the gas buoys in the Fifth Lighthouse District. The vessel will be 95 ft. long, 18 ft. beam, 108 tons displacement, with a 4 ft. draft. She will have water-tube boilers and twin screws, and her engines will make 325 revolutions per minute. The boat is to be ready for delivery in seven months.

New Municipal Building at Washington.

The Commission having in charge the construction of the new District Building at Washington, D. C., has selected the following jury of award for the competition of architects: The Engineer Commissioner of the District of Columbia, the Supervising Architect of the Treasury, Messrs. D. H. Burnham, of Chicago; George B. Post, of New York, and Robert S. Peabody, of Boston. The programme for the competition is being prepared and the names of the 12 architects to be invited to compete will shortly be announced.

A Tunnel Under Bunker Hill.

In accordance with an order recently introduced in the Boston Common Council, plans have been made for a tunnel under Bunker Hill. It is said the tunnel will be 24 ft. between walls with a roadway 18 ft. wide. The entire length will be about 1,677 ft.

Better Get Into the "Trust."

The Satilla Manufacturing Co., of Waycross, Ga., has recently contracted to build four standard caboose cars for the Atlantic & Birmingham R. R. This is in the line of an experiment and if it is a success the company will go into the business on a considerable scale, adding it as a branch to its present business in sashes, doors, blinds and dressed lumber. Its present equipment furnishes nearly all the machinery which will be required. The company has also been offered the contract for 50 caboose cars from another railroad, and from the present outlook it will accept this contract.

A Power Dam in the Chattahoochee.

The Atlanta Water & Electric Power Co., organized to build a large dam at a cost of $1,000,000 across the Chattahoochee River, has recently elected the following officers: President, S. Morgan Smith; Vice-President, Forest Adair; Board of Directors, S. Morgan Smith and C. Elmer Smith, York, Pa.; George C. Smith, Pittsburgh, Pa.; Forest Adair and J. C. Spalding, Atlanta. The company is capitalized at $1,500,000.

THE SCRAP HEAP.

Notes.

The Grand Trunk Ferry Company has been organized and will build a $300,000 car ferry to run between Grand Haven and Milwaukee in connection with trains on the Detroit, Grand Haven & Milwaukee Railway.

Interlocking.

An interlocking machine has been put in service at the crossing of the Michigan Central and Pere Marquette railroads at Otter Lake, and plans have been approved by the Commissioner of Railroads for one to be installed at the crossing of the Michigan Central and Pere Marquette railroads at Vassar.

Bids for Pneumatic Tubes.

On Aug. 15 bids were opened by the Acting Postmaster General at Washington for the rental of pneumatic tube service in Boston, New York, Brooklyn, Philadelphia, Washington, Chicago and St. Louis. The bids greatly exceeded the appropriation of $500,000 made by Congress for this purpose for the fiscal year 1903, and it was announced that no awards would be made at present, as it will be necessary to make some adjustment among the different cities in order to come within the amount appropriated. Some of the bids ranged as follows for the different cities, the different amounts being for different routes in each city:

Boston—Pneumatic Tube Company, from $37,624 per annum, or $23,515 per mile, to $87,360, or $16,000 per mile.

New York—New York Mail & Newspaper Transportation Co., $439,500 per annum, or $16,700 per mile.

Brooklyn—Same company as New York, $48,136 per annum, or $16,799 per mile.

Philadelphia—Pneumatic Transit Company, $129,914 per annum, or $17,000 per mile; American Pneumatic Tube Service Co., of Boston, from $130,450 per annum, or $13,500 per mile, to $28,274 per annum, or $21,100 per mile.

Washington—American Pneumatic Service Co., for 8-in. tubes, from $34,752 per annum, or $18,100 per mile, to $24,186 per annum, or $17,400 per mile; and for 10-in. tubes from $31,680 per annum, or $16,500 per mile, to $22,100 per annum, or $15,900 per mile. The Batchellor Pneumatic Service Co. bid $45,000 per annum, or $29,154 per mile.

Chicago—The Illinois Pneumatic Service Co., bidding on all routes and ranging for 8-in. tubes from $141,685 per annum, or $16,475 per mile, to $22,900 per annum, or $25,500 per mile, and for 10-in. tubes from $130,548, or $15,180 per mile, to $19,890, or $22,100 per mile.

St. Louis—Batchellor Pneumatic Tube Co., $59,958 per annum, or $20,194 per mile, and $72,011 per annum, or $21,267 per mile. The St. Louis Pneumatic Tube Co. for 8-in. tubes, from $63,525 per annum, or $16,500 per mile, to $48,267 per annum, or $15,570 per mile; for 10-in. tubes from $55,335 per annum, or $15,500 per mile, to $46,283 per annum, or $14,930 per mile.

Manchester Ship Canal.

The directors report for the first half of this year shows that the weight of toll-paying merchandise which passed over the ship canal during the two half-yearly periods under comparison was: Sea borne traffic, June, 1901, 1,262,744 tons, as against 1,457,523 tons in 1902. The

barge traffic in 1901 was 128,405 tons, as against 132,840 tons during the past half-year. As compared with the corresponding period of the previous year, the receipts showed an increase of £20,095, and, as the increase in expenditure was only £1,658, the increase of profit from the department amounted to £18,437. The increase of 194,779 tons in the sea-borne merchandise traffic was satisfactory, having regard to the continued depression in the North Atlantic trade which has seriously affected the import trade of the principal English ports during the past half year. The net result of the half year's working was a profit of £12,331, against £13,208 for the corresponding half of last year. The directors are in negotiation for the provision of £500,000 by an independent company for the construction on a portion of the racecourse site of a large dock and transit sheds to be leased to this company for 99 years at a fixed percentage on the amount expended.

Mr. J. J. Hill on Water Ways.

Speaking of the Isthmian ship canal, Mr. Hill declared he would not oppose its construction at an expense of even $500,000,000, but, in his opinion, 35 to 40 millions spent in deepening the channel of the Mississippi between New Orleans and St. Louis would give far better results in the end. As to money spent on the improvement of the upper waters of that same river he thought it would be much better invested in irrigating the arid regions of the great West.—*Exchange.*

A Rack for Holding Freight Tariffs.

Charles W. Cook, chief clerk in the general freight office of the Atchison, Topeka & Santa Fe, at Topeka, has designed a convenient rack for holding freight tariffs and has applied for a patent on it. From a rough sketch given in the State Journal, it appears that the chief novelty of the arrangement consists in its lightness and compactness. The rack consists of a series of very light shelves, about five or six inches square, inclined upward, each consisting of a single wire loop. It is said that in the general freight office at Topeka there are between 3,000 and 4,000 freight tariffs on file, of which nearly one-half are issued by the Santa Fe road. Hitherto, these tariffs have been kept in 224 books. The Santa Fe issues about 75 new tariffs, or amendments, every day, and receives a similar number from other roads, so that one man has to give his whole time to keeping these documents in order. The office receives an average of 50 telegrams a day inquiring about freight rates. The rack is suitable for local freight offices.

No Spasms of Virtue on This Line.

The pass of which this is a fac simile (reduced in size) is one of a large number which have been issued recently quite regardless of some efforts to reduce free transportation, and of the agreements that private cars

must pay 18 first-class fares. The "conditions" printed below are found on the back of the pass.

"While the management of this extensive transportation system, appreciates that all danger of an explosion, or of the Condenser dropping below the Ash-pan may safely be eliminated, owing to the thorough acclimatisation of the motive power, however, in consideration of securing this Pass, the person or persons named hereon, their heirs or assigns, voluntarily assume, in the event of accidents or mulish delays, the risk of ownership of the outfit, and expressly agrees that the aforesaid management shall not be liable for an injury to his or her physical or mental equipoise; that he or she is not a public officer or person elected, or appointed, or ever expects to be elected, or appointed a public officer under the Laws of this State or any other State:—the Connubial State excepted.

St. John's River Division	500	Yards.
Live Oak	700	"
Culinary	50	"
Total Yardage	1,250	"

"All under one management."

A Transcontinental Railroad in Australia.

Consul-General J. P. Bray writes from Melbourne that he has received a letter from Mr. J. J. Rendle, secretary of the North Australian League, Melbourne, relative to a proposed trans-continental railroad from Adelaide, South Australia, to Port Darwin, North Australia, and expressing the wish that the matter be brought to the attention of capitalists and railroad builders in the United States. The South Australian government, Mr. Rendle says, will introduce a measure in Parliament early this session offering capitalists facilities to build this line. The drought in South Australia and in the hinterland of New South Wales and Queensland has directed attention to the need of pastoral railroads to carry fodder and stock. The government of New South Wales, to assist pastoralists, has declared its intention of extending a line northwesterly from Bourke to the Queensland border, which will be a stage in the transcontinental line. It is the policy of the Queensland government to bisect the great lateral trunk lines with a north and south line from the border to Camooweal, which will form another stage. The length of the entire line from Adelaide to Port Darwin will be 1,896 miles.

Congressional Appropriations.

According to a document prepared by the clerks of the Appropriations Committees the amount actually appropriated by Congress last winter was $800,624,496.55, and the amount for work authorized to be contracted for was $262,711,465, or a grand total of $1,063,335,961.55. The total includes $21,069,500 for new ships for the navy and improvements at navy yards; $15,943,650 for additions to old and for new public buildings in different parts of the country; $38,336,160 for rivers and harbors, and $3,500,000 for buildings at the U. S. Military Academy at West Point.

Some European Notes.

The summer services on the Continent show with few exceptions decided acceleration. The service to Bale is quickened and trains to and from London now show gains of 2 hours 50 minutes, 25 minutes and 2¼ hours over last year. The Rome service is accelerated by 2 hours 40 minutes, and Milan via the St. Gothard is brought 3 hours 20 minutes nearer to London. The Hook of Holland route grows in favor every year, and the time from London to Munich is reduced from 33 hours 36 minutes to 26 hours 7 minutes; the time to Berlin is also cut, Berlin being reached 48 minutes earlier than last year. In Germany the best service is from Berlin to Hamburgh, a distance of 177 miles, which is run in a net time of 208 minutes. R. HOPE.

Responsibility for Marlboro Collision.

The Railroad Commissioners of Massachusetts have given a decision on the butting collision which occurred on the Marlboro Street Railway, June 28, when two cars collided as they were rounding a curve, many persons being injured, one, at least, fatally.

The decision states that while the motorman and the conductor of car No. 54 appear to have been familiar with the rules, one of which reminded them of a special workingmen's car to be met every Saturday afternoon at a particular turnout, they permitted their car, on the day in question, to pass this turnout without waiting for the other car. . . . "While the accident was apparently due immediately to the failure of employees to realize the responsibility resting upon them and to exercise the care to be expected of them, it is to be noted that car No. 54, though a large car, with double trucks, equipped to run at high speed, was not provided with a power brake. It is not clear that if it had been the collision would have been averted, but it is at least possible that the consequences would have been less serious."

The management of the road is criticised for the character and method of the publication of its time-table. "There should have been an official time-table with the meeting points of cars clearly designated, and the necessary steps should have been taken to make every employee familiar with it. . . . There is evident need of a greater appreciation of the risks involved in the operation of single track interurban railways. There can be no excuse for the frequent recurrence of accidents due to collision of cars. . . ."

Delights of the Tourist Car.

As I watched the porter spread the snow-white linen on our cozy berth I thought, what would the "pathfinder," Fremont, have thought, fifty years ago, of crossing the continent in this fashion? I have a dim recollection of going to bed, to sleep unbrokenly until next morning, when the refrain came softly from Perkins' berth—"An orange for you and an orange for me"—and I awoke refreshed to a pleasant reunion with the party. Some matron ladies were preparing breakfast. As they bustled about, wearing neat caps and white aprons, there was a homelike rustle that recalled and suggested a tempting spread. "Isn't this fine? I've never traveled in a tourist car before, but when my daughter came East she said it was the only way to travel contentedly, and I believe it." And the motherly soul emphasized her remarks by placing before her companion a cup of piping hot coffee. "Those are my sentiments also," said another. "I've been to California three times, and you couldn't hire me to go any other way."

The rest of this exciting romance will be found in a pamphlet issued by the Chicago & North Western.

Des Moines Union Station.

The Chicago, Burlington & Quincy Railroad has made a contract with the Des Moines Union for the use of the Union Depot at Des Moines, Iowa. The contract will expire May 1, 1918. This will dispose of the plan of the C., B. & Q. to build a new depot on the site of its present terminal on Fourth street. It will add two roads to the Union Station, making the total five, which includes the Chicago, Burlington & Quincy, the Keokuk & Western, the Chicago, Milwaukee & St. Paul, the Wabash and the Chicago Great Western.

Transportation Conditions in Dawson.

Henry D. Saylor, Consul, reports to the Government at length on the transportation conditions which exist at Dawson. Dawson is connected with the outside world by two routes, known as the inside and the outside. The inside route, used all the year around, extends by way of Skagway overland, and by river to Dawson. The other, used only in the summer, is to St. Michael, and thence up the Yukon. The ocean travel along the route from the Puget Sound country to Skagway averages during the summer season a boat a day, these vessels being of 1,000 tons or more. The journey through Wrangle Narrows in American waters is very dangerous on account of the high tides (18 ft.), absence of buoys to mark the channel, etc., and as a result maritime insurance premiums have become almost prohibitive. From Skagway, Alaska, to White Horse, Can., the White Pass & Yukon Railroad transports freight and passengers, the distance being about 111 miles. From White Horse to Dawson, in the winter time, the route follows the river for the greater part of the distance, which is about 384 miles. The trip is made in the winter season in commodious passenger stages drawn by four horses, which stages leave White Horse and Dawson twice a week; sometimes—travel warranting—oftener. About three stops are made daily, if a continuous day and night journey is not contemplated, and a relay of fresh horses is supplied every 25 miles. The trip is usually made in 17 relays, for which 68 horses are used. About 75 miles per day are made, on an average. The average fare from White Horse to Dawson during the winter was $100, the lowest being $90 and the highest $150, exclusive of excess baggage (each passenger being allowed 25 lbs. of baggage and all in excess being carried at the rate of 40 cents per lb.) and road-house expenses.

In the summer, the trip from White Horse to Dawson is made by steamboats on the Yukon River, and the fare averages $75, including board. This route, in connection with the railroad from Skagway to White Horse, forms the inside summer route referred to. The all-water route via St. Michael and up the Yukon River to Dawson is used very largely in the summer, and it is by this that the commercial companies bring in their supplies. The steamers on both routes are modern, constructed for the purpose, and well equipped; those on the lower river afford every convenience for the comfort and pleasure of the traveler.

The Railroads of Turkey.

The following notes on the railroads of Turkey are from the American Consul at Harput:

The following railroads were in operation at the beginning of the year 1901; with a few exceptions (noted) they are built with the normal gage of 144 centimeters (56.694 in.).

Oriental Railroad.—Main line from Constantinople to Bellova, in eastern Roumelia, where it connects with the line running through Sofia and Belgrade to Vienna. Branches to Yamboli, in eastern Roumelia, and to Dedeagatch, on the Ægean Sea. A secondary line from Salonica to Mitrovitz in the extreme northwest, has a branch from Uskub to Zibefdjé, on the Servian frontier, providing connection with the above-mentioned line to Vienna. Total length 786 miles.

Constantinople & Salonica Junction.—From Dedeagatch to Salonica, connecting the two main lines of the preceding railroad. Built by French capital. Total length 317 miles.

Salonica & Monastir.—Extends west from Salonica to Monastir. Length 136 miles. Built by German capital.

The following lines are in Asiatic Turkey and Syria:

Anatolian Railroad.—Extends from Haidar-Pasha on the Bosphorus, eastward to Angora; a short branch to Adabazar; a long branch from Eski Shehr southeasterly to Konieh. The continuation of this branch will form the Bagdad Railroad. Built mainly by German capital. Total length 641¼ miles.

Smyrna & Cassaba.—Extends east from Smyrna to Afion Karahissar, on the line of the Anatolian Railroad; branches near Smyrna to Soma and to Bournabat. Built by French capital; total length 321¼ miles.

Aidin Railroad.—With various short branches, extends east from Smyrna to Dinair. Built with English capital; total length 320½ miles.

Damascus & Hamah.—Extends from Beirut to Damascus and southward from Damascus to Mzerib. Gage 41½ in. Built by French capital; length 155⅓ miles.

Yafa & Jerusalem.—Connecting Jerusalem with the Mediterranean; gage of 1 meter; length 54 miles.

Mersine & Adana.—Connects two important centers—Adana and Tarsus—with the seaport of Mersine, on the southeastern coast of Asia Minor; length 41½ miles.

Moudania & Brousa.—From Moudania, on the Sea of Marmora, to the large city of Brousa. Gage 1 meter; length 25½ miles.

Commerce of Argentina.

The *Monthly Review* of Buenos Ayres states that 51,284 vessels of all kinds, with a tonnage of 12,629,329 tons, entered the ports of Argentina during 1901, and 51,422 vessels, aggregating 13,283,272 tons, cleared during the same period. Of the large steamships, 434 carried the English flag, 146 the German, 96 the Italian, 74 the French, and 56 the Spanish.

New Railroad in Russia.

Consul-General W. R. Holloway reports to the Government that preliminary work has commenced on the Vladicaucasus R. R. along the Caucasian coast of the Black Sea. The line starts from Enem Station on the present Vladicaucasus road, and will extend to Novosinaki Station on the Trans-Caucasian, which is to be extended to Armavir. The length of the line, when completed, will be 338 miles, at an estimated cost of $25,750,000.

New Railroad from Madrid to Bilbao.

Consul-General J. G. Lay, of Barcelona, reports to the Government that a company has been formed under the name of the Compania Ferro-viraria Vasco-Castellana, to build a direct double-track railroad from Madrid to the seaport of Bilbao, on the north, and that shares in the new enterprise are now being offered to the public. The company seems to be a development of the Sierra Company, Ltd., of London, Eng., which already holds the concession for 42 miles of railroad along the proposed route. A number of offers of money and land have been made by cities and towns along the route. The line is to be finished and in working order in five years from its commencement, and preliminary work has already been begun. The distance will be about 261 miles and the road will effect a saving of 85 miles between Madrid and Bilbao, making Bilbao the nearest maritime port to the capital. It is proposed to make the run in about six hours when the road is completed.

LOCOMOTIVE BUILDING.

The Mexican Central is having a locomotive built at the Baldwin Works.

The Pearl & Leaf River is having a locomotive built at the Baldwin Works.

The Boston & Maine denies that it is in the market for either locomotives or cars.

The Baltimore & Ohio has ordered 15 switching engines from the Baldwin Locomotive Works.

The Terminal Railway Association of St. Louis is having 11 locomotives built at the Baldwin Works.

The Michigan Central is having 12 locomotives built at the Schenectady Works of the American Locomotive Co.

The Detroit Southern is having five locomotives built at the Rhode Island Works of the American Locomotive Co.

The St. Louis, Troy & Eastern is having a locomotive built at the Richmond Works of the American Locomotive Co.

The Chicago Great Western has ordered 40 locomotives from the American Locomotive Co., to be built at the Brooks Works.

The Illinois Central is having 12 locomotives built at the Schenectady Works of the American Locomotive Co., and 42 built at the Rogers Works.

F. M. Hicks, of the Hicks Locomotive & Car Works, has sold during the past week one rebuilt locomotive to each of the following companies: Montour R. R., Royal Sewer Pipe & Fire Brick Co., Akron, Ohio; Farmsworth Lumber Co., Scranton, Miss.; C. H. Sharpe, Paul's Valley, Ind. T., and to Schoedinger, Fear & Co., of Columbus, Ohio.

The Oregon Short Line has ordered 15 Vauclain compound consolidation locomotives from the Baldwin Locomotive Works. These engines will weigh 190,000 lbs., with 170,000 lbs. on the drivers, and have 16 and 27 x 30 in. cylinders, 56 in. drivers and straight top, wide fire-box boilers, with a working steam pressure of 200 lbs., 357 steel tubes, 2 in. in diameter, 15 ft. long, with carbon steel fire-box 108 in. long and 66 in. wide, tank capacity 6,000 gallons of water, and 15 tons of coal. The special equipment includes: Steel axles, "Little Giant" bell ringers, Pressed steel brake-beams, cast-iron brake-shoes, Buckeye couplers, Simplex injectors, Mitchell piston and valve rod packings, Coale safety valves, Leach sanding devices, Nathan sight-feed lubricators, Baldwin springs, Ashton steam gages, Standard

driving and truck wheel tires, chilled tender wheel tires, steel wheel centers and Keasbey & Mattison 85 per cent. block lagging.

The Cincinnati, New Orleans & Texas Pacific is having at the present time 24 locomotives built at the Baldwin Works, and 17 by the American Locomotive Co., for October, November and December, 1902, delivery. These engines are all simple consolidation, weighing 120,000 lbs.; weight on drivers, 106,000 lbs.; cylinders, 20 x 24 in.; diameter of drivers, 50 in.; straight boilers, with working steam pressure of 180 lbs., and 240 tubes which are 13 ft. 7 in. long; dimensions of fire-box 108 x 33 in., to be built of carbon steel; tank capacity for water, 4,000 gal.; coal capacity, eight tons. The special equipment includes Westinghouse air-brakes, open-hearth steel axles, Golmar bell ringers, Sterlingworth brake-beams, Janney couplers, Schroeder headlights, Monitor injectors, U. S. piston rod packings, American valve rod packings, Coale safety valves, Waters sanding devices, Nathan sight feed lubricators, French springs, Midvale and Standard tires and steel wheel centers.

The Mobile & Ohio order for locomotives, reported in our issue of July 25, calls for one simple consolidation of 180,000 lbs., and 15 simple 10-wheelers of 160,000 lbs. The consolidation will weigh on drivers 160,000 lbs.; cylinders, 22 x 28 in. stroke; diameter of drivers, 56 in. outside of tire; boiler of Otis steel, with working steam pressure of 200 lbs., and 348 tubes of Pacific iron, 14 ft. long, with an outside diameter of 2 in.; fire-box, 120 x 42⅛ in., to be built of carbon steel; tank capacity for water, 6,000 gal.; coal capacity, 12 tons. The 10-wheelers will weigh 123,000 lbs. on drivers; cylinders, 20 x 26 in.; diameter of drivers, 62 in. outside of tire; wagon-top boilers of Otis steel, with working steam pressure of 200 lbs., and 312 tubes of Pacific iron, 15 ft. long and 2 in. outside diameter; fire-box, 120 1/16 in. long x 41⅛ in. wide, to be built of carbon steel; tank capacity for water, 6,000 gal.; coal capacity, 12 tons. The special equipment for both classes of engines includes Westinghouse air-brakes, hammered steel axles, pneumatic bell ringer, Damascus brake-beams, Corning brake-shoes, Gould couplers, with Miner friction draft gear at rear of tender; electric headlights, Ohio injectors, U. S. metallic piston rod packings, Richardson balanced valve rod packings, consolidated safety valves, Mudd sanding devices, Chicago sight feed lubricators, Chas. Scott Spring Co.'s springs, Crosby gages, Paige steel tired truck wheels, cast-steel wheel centers, and Keasbey & Mattison magnesia lagging. U. S. bronze is to be used for all bearings.

CAR BUILDING.

The Great Northern has ordered 16 coaches from the Pullman Co.

The Boston & Albany, it is reported, will place an order for 25 coaches.

The Chicago City Ry. has ordered 80 large cars from the St. Louis Car Co.

The Cincinnati Northern is having 200 freights built at the Western Steel Works.

The Ozark & Cherokee Central is reported to be in the market for new equipment.

The American Car & Foundry Co. has miscellaneous orders for 39 cars of various types.

The Detroit Southern advises that the order which we reported in our issue of Aug. 22 is incorrect.

The La Follette Coal & Iron Co. is having eight freights built by the American Car & Foundry Co.

The Wabash is having five coaches built at the Jeffersonville Works of the American Car & Foundry Co.

The Berwind-White Coal Co. is having 10 freights built at the Middletown Car Works, Middletown, Pa.

The California & Northwestern has ordered 20 box and 20 stock cars from the American Car & Foundry Co.

The Michigan Chemical Co. is having 10 freights built at the Milton Works of the American Car & Foundry Co.

The St. Louis & San Francisco has ordered 1,300 box cars of 60,000 lbs. capacity from the American Car & Foundry Co.

The Atchison, Topeka & Santa Fe is having 400 freights built at the Chicago Works of the American Car & Foundry Co.

The Pearl & Leaf River is having three coaches built at the Jeffersonville Works of the American Car & Foundry Co., in addition to the order reported in our issue of July 18.

F. M. Hicks, of the Hicks Locomotive & Car Works, has sold during the past week rebuilt cars of various types to the Stanley, Merrill & Phillips R. R., Columbus & Lake Michigan R. R., St. Louis & Hannibal R. R., Bessemer Coke Co. and Louisiana & Arkansas and Rutland Street railroads.

The Buffalo & Susquehanna order for 200 coal cars of 80,000 lbs. capacity reported in our issue of August 22 with Barney & Smith, is for January, 1903, delivery. The cars will be 34 ft. long, 9 ft. wide and 61¼ in. high, with ¾ in. space between floor and sides, to be built of wood, with metal underframes. The special equipment includes: M. C. B. 80,000 lb. 1900 standard axles; Barney & Smith all metal bolsters with malleable end castings, body truck center plates; M. C. B. lead-lined Magnus Metal Company's brasses; Tower couplers; Dayton twin spring draft rigging; M. C. B. cast-iron 80,000 lb. journal boxes; M. C. B. journal box lids; Prince's mineral paint; Barney & Smith all metal rigid trucks, and 33 in. 650 cast-iron Barney & Smith wheels.

The Oregon Short Line has ordered 300 flat bottom gondolas, with dump doors, of 100,000 lbs. capacity, and 500 stock cars of 60,000 lbs. capacity from the Standard Steel Car Co. The gondola cars will weigh 36,000 lbs., length, 42 ft. 7⅛ in. over end sills; width, 9 ft. 6 in. over side sills; height, 4 ft. from floor to top of sides, to be built of steel, with steel underframes. The stock cars will weigh 31,000 lbs., length 37 ft. 10 in. over end sills, width 9 ft. ⅝ in. over side sills, height 8 ft. from floor to carlines, with steel framing, wood girths and floor; and metal underframes. The special equipment for gondola and stock cars includes: Steel axles, Standard Steel Car Company's bolsters, Pressed steel brake-beams, Congdon cast-iron brake-shoes, Magnus metal brasses, Buckeye couplers, Miner improved draft rigging, M. C. B. cast-iron journal boxes, M. C. B. (Morris) journal box lids, A. French Spring Company's springs, Standard Steel Car Company's trucks and cast-iron wheels.

BRIDGE BUILDING.

ABERDEEN, MISS.—Bids are wanted until Sept. 1 for four bridges.

ALLEGHENY, PA.—Bids will be received at the office of the City Comptroller until Sept. 9 for a bridge on Shady avenue over Woods Run Valley. The estimates for superstructure and substructure are to be separate. D. L. Fulton, Director Department of Public Works.

APPLETON, WIS.—We are told that bids are wanted Sept. 3 for a concrete or stone bridge 608 ft. long, to consist of about 15 arches, and to cross Fox River. The estimated cost is $34,000, bids to be addressed to the City Clerk.

AURORA, ILL.—The Elgin, Aurora & Southern Traction will build a new bridge over Fox River on the road between Coleman and Five Islands, to replace the present structure.

BALTIMORE, MD.—The Western Maryland R. R. is preparing to replace the wooden bridges on the system with steel structures.

BEEVILLE, TEXAS.—Bids are wanted Sept. 8 by the Bee County Commissioners for a bridge over Medio Creek.

BELLEVILLE, ONT.—Bids are wanted Sept. 8 for a steel highway bridge. Wm. R. Aylsworth, County Clerk.

BUFFALO, N. Y.—Bids are wanted by the Commissioner of Public Works, Sept. 4, for building the abutments and wing walls for the Sprenger avenue bridge. Francis G. Ward, Commissioner.

CATLETTSBURG, KY.—The County Surveyor wants bids until Sept. 10 for building seven steel or other bridges in the county. E. E. Lawrence, County Clerk.

COLUMBIA CITY, IND.—Bids are wanted until Sept. 4 by the Board of Commissioners of Whitley County for building three bridges.

CONNELLSVILLE, PA.—The Greenwood Bridge Co., which some time ago secured a charter to build a bridge over the Youghiogheny River, between Connellsville and Greenwood, is again taking steps to have the objection of the B. & O. overruled and permit the company to build its bridge. L. F. Ruth and Rockwell Marietta are interested in the bridge. Some time ago it was said that the plans for the proposed structure were made by the Osborn Engineering Co., of Cleveland.

CORVALLIS, ORE.—Bids are wanted Sept. 3 by Surveyor Jones for a bridge over Rock Creek.

CULPEPER, VA.—Bids are wanted at the County Clerk's office until Sept. 3, to be opened by the Board of Supervisors Sept. 4, for two steel highway bridges, one 85 ft. long and the other 129½ ft. C. B. Chilton, one of the committee.

DELPHI, IND.—The Board of Commissioners of Carroll County want bids Sept. 1 for building two bridges. James C. Smock, Auditor.

EGAN, S. DAK.—The Commissioners of Moody County want bids until Sept. 2 for a bridge over Big Sioux River. A. J. Vallier, County Auditor.

ERIE, PA.—City Engineer B. E. Briggs tells us that no plans have yet been adopted, or agreement made between the city and the Pennsylvania R. R., for the proposed bridge at Twentieth street.

The Pittsburgh & Lake Erie, it is said, has offered to give $25,000 toward the cost of a bridge at East avenue.

FOWLER, IND.—The County Commissioners want bids Sept. 3 for building several steel bridges. James S. Smyth, County Auditor.

FREDERICTON, N. B.—Tenders are invited by the Hon. C. H. Labilloir, Commissioner of Public Works, for rebuilding the McLaggan Creek bridge across the Nashwaak river, and the bridge across Renour river in North-Cumberland County.

HILLSBORO, MO.—Bids are wanted Sept. 2 by Philip M. Reilly, County Surveyor, for a steel bridge five miles east of Eureka.

HOLT, MONT.—The Great Northern, according to report, is surveying for a site for a proposed bridge over Flathead River near Holt.

INDIANAPOLIS, IND.—The county budget for next year shows an estimate of $125,000 for new bridges, of which $75,000 is for the College avenue structure in the city of Indianapolis.

JOLIET, ILL.—The Elgin, Joliet & Eastern, we are told, will build the proposed viaduct at Maple street.

LAFAYETTE, IND.—Bids are wanted until Sept. 3 for a bridge in Wabash Township. Geo. A. Jamison, Auditor.

LION'S HEAD, ONT.—Tenders are being received by C. W. W. Dalton for the erection of a bridge over Fern Creek.

MANKATO, MINN.—Bids are wanted Sept. 3 for a bridge over Madison Lake at the outlet; also for building two stone piers at another location. Edgar Weaver, County Auditor.

MANSFIELD, OHIO.—Bids are wanted by the City Clerk until Sept. 13, for a steel viaduct on South Mulberry street across Ritter's Run. Plans are with the City Civil Engineer. The bridge will be 300 ft. long and 30 ft. wide. D. S. Koontz, City Clerk.

MODESTO, CAL.—The Supervisors have accepted plans for the proposed bridge over the Stanislaus River.

MONTGOMERY, ALA.—The County Commissioners have decided to build a bridge across the river at Louina. The contract will probably be let early next year.

NILES, OHIO.—The County Commissioners are considering building a bridge over Mosquito Creek at Robbins avenue at a probable cost of $15,000.

OMAHA, NEB.—The Union Pacific and the Union Stock Yards companies have agreed upon plans for building the O street viaduct, the estimated cost of which is $80,000.

PEORIA, ILL.—The Peoria & Pekin Union Ry. denies that it proposes to build a bridge over the river at Peoria.

PERU, IND.—The Board of County Commissioners want bids at the Auditor's office until Sept. 3 for two steel bridges and two stone and brick arch culverts; also for a concrete steel arch for each of the above. Peter Kelly, Surveyor.

PHILADELPHIA, PA.—The Board of Supervisors has approved the plans for the western approach to the proposed bridge over the Schuylkill on the line of Passyunk avenue. The plans include three piers and one abutment, and bids for the work will be asked at once, $50,000 being available. The bridge, it is estimated, will cost about $1,000,000.

PITTSBURGH, PA.—Mrs. Rebecca B. Berger is applying to the City Council for permission to build a bridge over Evan's Alley.

PLAINFIELD, N. J.—The bridge committee of the Union County Freeholders is said to have accepted plans for the Jackson avenue and Berchman street bridges.

PORTLAND, ORE.—Bids are wanted at 2 p.m., Aug. 30, for building a combination bridge over Sandy River.

PORTSMOUTH, VA.—Plans have been made for the concrete and steel bridge to be built over Guthrie Creek branch of Elizabeth River by the Government. The estimated cost is $5,000, and Fred. Thompson, Engineer in Charge, Department of Yards and Docks, Navy Yard, can give further information.

POTTSTOWN, PA.—Plans have been made for two new bridges in Bucks County, one to be over the west branch of the Perkiomen Creek in Washington Township; the other will be over the Perkiomen in Hereford, both to be steel structures.

READING, PA.—The county officers are again considering the advisability of building a bridge over the Schuylkill River at the foot of Sixth street. The viewers reported last week.

SANTA CRUZ, CAL.—Bids are wanted by the County Clerk Sept. 2 for a steel bridge 160 ft. long.

SCRANTON, PA.—It is said that bids will be wanted in a few weeks for the viaduct to be built over the Lackawanna tracks on West Lackawanna avenue. J. P. Phillips, City Engineer.

SOUTH VALLEY, N. Y.—The State Superintendent of Public Works at Albany will receive bids on Sept. 2 for building a bridge over Allegheny River on the Allegheny Indian reservation.

THREE RIVERS, MICH.—Bids are wanted until Aug. 30 for building a cement arch bridge over St. Joseph River, to be 160 ft. long and 60 ft. wide. It is to have not less than two arches or more than five. James E. Bunn, City Clerk.

VALLEY, NEB.—The County Commissioners are considering the advisability of building a bridge over Platte River. Probable cost, $15,000.

VICTORIA, B. C.—The City Council will soon invite tenders for the Point Ellice bridge.

WATERVILLE, ME.—W. T. Haines, of Waterville, tells us that bids will be wanted some time between now and April next year for the proposed 400 ft. suspension bridge over Kennebec River.

WILKESBARRE, PA.—The County Commissioners are about to re-advertise for bids on 14 stone bridges in various parts of the county.

WINNIPEG, MAN.—The Canadian Pacific Railway Company will build steel bridges over the Souris river at Monteith and Treesbank, and the Assiniboine river at Headingley, Man.

Other Structures.

BUFFALO, N. Y.—C. H. Halcomb, of New York, formerly President of Crucible Steel Co. of America, is said to be interested in the project to build a new steel plant at Buffalo.

CARLISLE, PA.—The Letort Axle Works, owned by Frank Gardner's Sons, it is said, will be enlarged. Considerable new machinery is to be bought.

CEDAR RAPIDS, IOWA.—The Chicago, Rock Island & Pacific, it is said, will make an addition to its new shops in this place.

CHATTANOOGA, TENN.—The American Brake-Shoe & Foundry Co. contemplates building an extension to its plant at Chattanooga.

CHESTER, PA.—The Pennsylvania R. R. has begun work on a new freight station preparatory to elevating the tracks through the city.

CRAWFORDSVILLE, ILL.—Plans for the new Big Four passenger station have been made and have been submitted to contractors for bids.

CUYAHOGA FALLS, OHIO.—It is said that capitalists of Pittsburgh, Youngstown and Akron have secured a location at Cuyahoga Falls, where a new nut, bolt and rivet plant will be built. The company is about to be incorporated with $200,000 capital.

ELYRIA, OHIO.—The Columbia Steel Co. has advertised for bids for erecting its building near the junction of the Lake Shore & Michigan Southern and the Baltimore & Ohio roads at this place. The plans call for a main building 400 x 800 ft., and several other buildings. Walter P. Rice, of Cleveland, is the Engineer, and J. C. Smith, of Elyria, is Manager.

FONDA, N. Y.—The New York Central is said to have adopted plans for the new passenger station in this village. Considerable other work, such as improving the yards, is also to be done.

FORT DODGE, IOWA.—The Chicago Great Western has just let contracts for 12 stations to be built along its Omaha extension now building west of this city, to Anderson Bros., of Council Bluffs, at $30,624.

GADSDEN, ALA.—M. W. Bush, Superintendent of the Gadsden plant of the Alabama Consolidated Coal & Iron Co., was in Pittsburgh on Aug. 25 arranging to place contracts for material for the new furnace which the company is about to build at Gadsden.

GUTHRIE, OKLA. T.—The Santa Fe system has begun work on a new passenger station in Guthrie which, it is said, will cost about $60,000. It is to be finished by Jan. 1.

LAKE CHARLES, LA.—H. I. Van Vleck and L. Shillingslaw are said to have secured a site in this place where a machine shop and car works are to be built. The Board of Trade may be able to give information.

MEMPHIS, TENN.—The Illinois Central will soon begin work in South Memphis on its new machine and car shops.

MONTREAL, QUE.—The Harbor Commissioners of Montreal are building a 1,000,000 bu. elevator, which is to be completed by Aug. 1, 1903. The Grand Trunk Ry. is also building an elevator of the same capacity in Montreal Harbor, which will be ready in the fall of the same year.

PATERSON, N. J.—The Jersey City, Hoboken & Paterson Street Ry. Co. will at once build new car barns in Paterson at a cost of about $100,000.

PITTSBURGH, PA.—The Pennsylvania is said to be making plans for an electric power plant to be built at

South Thirteenth street to furnish the power to operate the signals on the Monongahela Division.

PUTNAM, CONN.—The Worcester & Eastern Connecticut Ry. will soon begin work on building a shop to be 100 x 30 ft.

SPOKANE, WASH.—The Northern Pacific has completed plans for a $10,000 addition to the station in this city. The contract will be let at once.

SYDNEY, N. S.—John F. Stairs, President of the Nova Scotia Steel & Coal Co., is reported to have said: "The directors . . . have decided on the erection of a new steel plant, and it was principally on this account we decided on the issue of $1,910,000 stock that we had in the treasury."

TOPEKA, KAN.—Improvements to the extent of $10,000 are to be made at the plant of the Topeka Steam Boiler Works on Jefferson street, owned by Joseph Bronich.

WATERLOO, IOWA.—It is said that the Illinois Central proposes to erect a plant in this place to make car wheels.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)

Roadmasters' and Maintenance of Way Association.

The 20th Annual Convention of the Roadmasters' and Maintenance of Way Association will be held at the Plankinton House, Milwaukee, Wis., Sept. 9, 10 and 11, 1902.

Eastern Maintenance of Way Association.

The Eastern Maintenance of Way Association has decided to omit this season, the usual public invitation to, and statement of questions to be discussed at a general convention of the Association this year. In lieu of the usual public convention, an informal single business session composed probably mostly of local members will be held in Boston, presumably some time in September. F. C. Stowell, Secretary, Charlestown, Mass.

Pacific Northwest Society of Engineers.

The Pacific Northwest Society of Engineers held its regular monthly meeting at the Chamber of Commerce rooms in Seattle on August 2, at 8 p.m. The meeting was presided over by Mr. C. E. Fowler, First Vice-President, and a paper was presented by Mr. R. H. Thomson, President, on "Septic Tank Sewerage Systems," particularly as regards their application to northwest cities. After a brief review of sewage disposal, a short history of Septic Tanks was given and then the system was explained in detail, a large drawing of a modern tank being used for illustration. The meeting was largely attended and an interesting discussion took place after the paper had been read. The Society at each meeting shows a gratifying increase, 27 new members having been accepted.

The American Street Railway Association.

The 21st annual meeting of the American Street Railway Association will be held in the Light Guard Armory, Detroit, Mich., Wednesday, Thursday and Friday, Oct. 8, 9 and 10. Papers will be presented on the following subjects: The Registration of Transfers, C. D. Meenely, Brooklyn Heights R. R.; Benefit Associations, Oren W. Root, Jr., Metropolitan Street Ry., New York; Discipline of Employees by the Merit System, W. A. Satterlee, Metropolitan Street Ry. Co., Kansas City; The Transportation of Light Express and Parcel Delivery, George W. Parker, Detroit United Railway; Steam Turbine Engines, E. H. Sniffin, New York; Signals for Urban and Inter-Urban Railways, Old Colony Street Ry. Boston; The Adjustment of Damage Claims, M. B. Starring, Chicago City Ry.

There will be a large exhibition of street railroad supplies, and Thursday, Oct. 9, has been set apart as Exhibitors' Day. Headquarters will be at the Cadillac Hotel. The annual dinner will be held Friday evening, Oct. 10, when the officers elect will be installed. The Passenger Associations have granted rates of one fare and one-third for the round trip. Members must get a certificate from the ticket agent when buying ticket and leave it with the clerk at the convention hall.

PERSONAL.

—Mr. William H. Ely, at one time Secretary and Treasurer of the Lehigh Valley Railroad, died at his home in Beverly, N. J., Aug. 21, at the age of 68.

—Mr. Robert M. De Lambert, General Storekeeper and Auditor of Motive Power accounts of the Northern Pacific and recently Acting Superintendent of Motive Power, died on Aug. 23 at St. Paul. He was 50 years old and had been with the company 20 years.

—Mr. Charles F. Hanson, at one time Mechanical Superintendent of the London & Port Stanley Ry., and later Mechanical Superintendent on the Detroit & Milwaukee and of the Grand Trunk, died at London, Ont., Aug. 17. For the past 15 years Mr. Hanson has lived in retirement. He was about 83 years old.

—Mr. Beverly Welford Wrenn, formerly Traffic Manager of the Plant System, with headquarters in Savannah, has just been appointed General Agent of the New York Life Insurance Co., with headquarters in Brooklyn, N. Y. Mr. Wrenn began his railroad service in 1868, and has been with a number of the roads in the southeast. Early in 1895 he was appointed General Traffic Manager of the Plant System.

—Mr. C. G. Wakeley, who has recently been appointed Superintendent of the Florida East Coast Railway at St. Augustine, Fla., began his railroad career in 1876 as a telegraph operator on the Lake Shore & Michigan Southern, Eastern Division, and was there until 1882, when he was made an operator and despatcher on the New York, Chicago & St. Louis at Conneaut, Ohio. He was there for eight years or until 1890, when he went to Jacksonville to become despatcher on the Jacksonville, Tampa & Key West for three years. In 1893 he was appointed Chief Despatcher, F. E. C. Ry.

—Mr. Philip T. Lonergan, whose appointment as Superintendent of Motive Power and Rolling Stock of the Rutland Railroad is announced elsewhere, was formerly Division Superintendent of Motive Power on the Rome, Watertown & Ogdensburg Division of the New York Central at Oswego. Mr. Lonergan begun work in 1876 as a draftsman with the Delaware, Lackawanna & Western Railroad, with whom he stayed five years. He was also a draughtsman with the New York Central at New York for about 12 years, and in 1893 became Master Mechanic of the Rome, Watertown & Ogdensburg, later assuming the office he has just left.

—Mr. Charles A. King, whose appointment on the Chicago & Alton is announced in another column, began service with that company in 1881, and the following are the appointments since that time: 1882-1888, Agent and telegraph operator at various stations in Missouri and Illinois; 1888, clerk to Assistant Superintendent at Slater, Mo.; 1894, Freight Agent at Alton, Ill.; 1897, chief clerk to Assistant General Freight Agent at St. Louis, Mo.; 1898, Traveling Freight Agent, Mexico, Mo., and Jacksonville, Ill.; July 1, 1902, Division Freight Agent, in charge of the Western Division, headquarters Mexico, Mo., and Sept. 1, 1902, Assistant General Freight Agent, Chicago, Ill.

—Mr. Louis Faithorn, Chief Assistant General Freight Agent for the Chicago & Alton Ry., will leave that company on Sept. 1 to become Traffic Manager Dupont Powder Company, at Wilmington, Del. After leaving school Mr. Faithorn entered the Chicago & Alton Railroad service in 1879, as clerk in the Local Freight Office, Chicago. In 1880 he was assigned to a clerkship in the General Freight Department at Chicago, and in 1881 was made Chief Clerk, General Freight Department. He resigned in 1889 to accept Commercial Agency, and subsequently, General Freight Agency of the St. Louis, Peoria & Northern at St. Louis, Mo. In 1900 he returned to the Chicago & Alton as Chief Assistant General Freight Agent, at Chicago.

—Mr. Dewitt C. Moon, who has been appointed Superintendent of the Lake Erie & Western at Cleveland, Ohio, began his railroad service in 1874 as a telegraph operator and agent for the Allegheny Valley & Pittsburgh at Dunkirk, N. Y. He was Train Despatcher from 1874 to 1889, and then for one year he was clerk in the Auditor's office, and also was freight traffic clerk. For three years to 1893 he was Trainmaster, then for three years to Aug. 1, 1896, he was Assistant Superintendent, and was Division Superintendent until April 1, 1899, when he left the Dunkirk, Allegheny Valley & Pittsburgh to become Superintendent of the Rome, Watertown & Ogdensburg Division of the New York Central & Hudson River at Watertown, N. Y., which position he has just resigned.

—Mr. Peter E. Garrison, Master Mechanic of the Fonda, Johnstown & Gloversville, died suddenly in his office at Gloversville, N. Y., last week. He was born Oct. 26, 1845, at Paterson, N. J., and began railroad service in 1868. From that time up to 1880 he was a machinist on the New York, Lake Erie & Western at the Port Jervis shops. The following three years he was General Foreman on the Greenwood Lake R. R. at Pompton Junction, N. J. From 1883 to 1885 he was General Foreman on the Chicago & Atlantic R. R. at Huntington, Ind., and from the latter date to 1891 he was General Foreman of the West Shore R. R. shops at Frankford, and for seven years to 1898 he was Master Mechanic of the Western Division of the same road, the position he held at the time of his death.

—Mr. C. E. Carson, who has just been appointed Superintendent of Terminals for the Missouri Pacific and Iron Mountain railroads at St. Louis, is 38 years old, and has been in railroad service since 1882. He began in that year as a switchman on the Kansas City, Fort Scott & Memphis, and later became Yardmaster, then Chief Clerk to the Superintendent of the Terminal R. R. Association of St. Louis, and since April 15, 1897, he has been Superintendent of the Terminals of the Missouri Pacific in Kansas City, Mo. Mr. Carson was President of the Central Railroad Association in 1900 and in 1901. As Superintendent of Terminals at St. Louis, Mr. Carson will prepare to handle the crowds that are expected to attend the World's Fair in that city in 1904.

—Mr. George W. Kenney, who has just resigned as Superintendent of Motive Power and Rolling Stock of the Rutland Railroad, has been with that company under one management or another, for practically 37 years. He began as a fireman in 1865. After five years he was made an engineman, in which capacity he acted until 1882, when he was appointed Division Master Mechanic under the Central Vermont with headquarters at White River Junction. After nine years' service in this capacity he returned to Rutland as Division Master Mechanic until 1896. Then he was made Superintendent of Motive Power, and as such continued to act until last September, when he was appointed Superintendent of Motive Power and Rolling Stock of the entire Rutland system. Mr. Kenney was born at Vernon, Vt., Feb. 19, 1845.

—Mr. N. L. Rand, the new Master Mechanic of the St. John & Halifax Division of the Intercolonial Railway, was born Oct. 28, 1843, at Shediac, N. B., Canada. He began his railroad work on the European & North American Ry., which extends from St. John to Shediac, as an apprentice in the machine shops at Shediac in 1859. After serving his apprenticeship, he continued in service in the same shop as machinist until 1866, when he went on the road as a fireman for 18 months, then he was a locomotive engineman until 1875, when he was made Locomotive Foreman of the new shops of the Intercolonial Ry. at Moncton. (The European & North American R. R. had, by this time, been merged with the Intercolonial Ry.) He was in charge at Moncton shops for 23 years, or until 1898, when he was appointed General Roundhouse Foreman. In 1900 he was appointed Road Foreman of Engines on the St. John & Halifax Division, and on Aug. 7 of this year became Master Mechanic of the same division.

—Mr. A. W. Lilliendahl, who was just recently elected President and General Manager of the Coahuila & Pacific Railroad, was the general contractor for building this 188-mile railroad from Saltillo to Torreon, Mexico, until its completion on July 8 of this year, when he was elected President. Mr. Lilliendahl was born in Jersey City, N. J., June 29, 1861. He was educated in the public schools of that city and was graduated from Columbia University as a Mining Engineer, in 1883. From that year to 1885 he was Assistant Superintendent at the Aurora Smelting & Refining Co., Aurora, Ill., and after that for three years he was Superintendent of the Grande Milling & Mining Co. at Guanajuato, Mexico, and then for 12 years he was Superintendent of the Mazapil Copper Co. at Concepcion del Oro, Mexico. In 1894 he began to build the Coahuila & Zacatecas Railroad, 87 miles, from Saltillo to Concepcion del Oro, and when it was finished he acted as Superintendent for eight months. In 1900 he became General Contractor for the Coahuila & Pacific, as above stated.

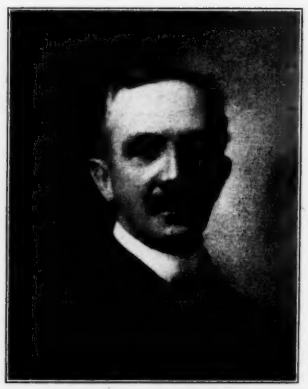
—Mr. Jesse Newton Seale, who was appointed Superintendent of Transportation of the Southern Railway on Aug. 11 last, with headquarters at Washington, D. C., has been in railroad service since 1875, when he was a messenger boy with the Mobile & Ohio. From that year up to November, 1881, he was telegraph operator, agent, roadmaster's clerk, superintendent's clerk and train despatcher on the same road. For a year he was with the General Manager of the Cincinnati Southern, and for the four years following was on the Texas & Pacific. In 1883 he was with the Western Union Telegraph Co., and the Associated Press, and was also a train despatcher on the Southern Pacific. From November, 1883, to October, 1886, he was chief despatcher on the Alabama Great Southern. Then he was appointed Trainmaster of the Mobile & Ohio, and in April, 1888, Assistant Superintendent at Jackson, Tenn., on the M. & O., and in May, 1899, he was appointed Superintendent of Transportation of the same road, holding that office for 13 years.

—Mr. F. H. Stark, the new Superintendent of the Montour Railroad, was born May 15, 1862, at Albany, N. Y. He entered railroad service in 1877, since which time he has been in continuous service as follows: 1877 to 1880 with the Lake Shore & Michigan Southern; 1880 to 1884 with the Cincinnati, Hamilton & Dayton; 1884 to 1886, Assistant Foreman, Consolidated Rolling Stock Co.; 1886 to 1888, General Foreman, and 1888 to 1889, Superintendent of the shops for the same company. From 1889 to 1892 he was Master Car Builder on the Wheeling & Lake Erie, and from 1892 to 1902, Master Car Builder on the Cleveland, Lorain & Wheeling Railroad. On the absorption of the C., L. & W. by the Baltimore & Ohio, Mr. Stark was transferred to Baltimore as General Foreman, Car Department. He resigned this position July 15, 1902, to become Superintendent of Rolling Stock for the Pittsburgh Coal Company, and has also charge of the Montour Railroad and Pittsburgh & Moon Run Railroad, as Superintendent of Railroad and Rolling Stock, with headquarters at Coraopolis, Pa. He is a member of the Master Car Builders' Association and Western Railroad Club.

—Mr. William A. Nettleton, Assistant Superintendent of Motive Power of the Atchison, Topeka & Santa Fe at Topeka, Kan., has resigned to engage in private business. Mr. Nettleton was born at Hannibal, Mo., in October, 1863, and entered railroad service in 1885, after graduating from Yale University, and worked as rodman and levelman on the Kansas City, Fort Scott & Memphis for one year, or until June, 1886, when he became a student with the Westinghouse Air-Brake Co. for about a year, being then appointed air-brake inspector on the Kansas City, Fort Scott & Memphis. The year following he became a student with the Union Bridge Co. at New York, and in 1888 he was inspector for Morison & Corthell of the Union Bridge Co., Athens, Pa., and the next year, 1889, he was inspector for A. P. Boller on the Thames River bridge at New London, Conn. Mr. Nettleton was Engineer of Tests on the Kansas City, Fort Scott & Memphis from October, 1889, to May, 1892, when he was appointed Superintendent of Terminals for the Kansas City & Memphis Railway & Bridge Co. at Memphis, Tenn. In August, 1893, he left this latter position and returned to the K. C., F. S. & M. as Assistant Superintendent of Motive Power and Cashier, which position he held until April, 1895, when he was appointed Superintendent of Motive Power and Machinery for the same road. Last year he left that company to join the Santa Fe System.

—Mr. Horace Augustus Summer, the Chief Engineer of the Denver, Northwestern & Pacific Ry., with office at Denver, Colo., was born on March 18, 1845, at Stoughton, Mass. He was graduated from Francis Summer's Academy in 1864, and entered railroad service as a rodman on the Old Colony Railway in Massachusetts in the same year. He remained with this road until March, 1868, and from that year until July, 1870, he was Assistant Engineer on the Burlington & Missouri River Railroad in Iowa, and from July, 1870, to June, 1873, he was Assistant Engineer of the Burlington & Southwestern in Iowa and Missouri. He then became Engineer of the Board of Public Works of the city of Burlington, Iowa, holding that position until December, 1874. Until July, 1878, he was Chief Engineer and Superintendent of Track, Bridges and Buildings with the Chicago, Burlington & Kansas City and the St. Louis, Keokuk & Northwestern railroads. For five years beginning July, 1880, he was Resident Engineer on Construction of the Chicago, Burlington & Northern in Wisconsin, and from July, 1886, to December, 1887, he was Locating Engineer for the Colorado Railway west of Denver. Then from December, 1887, to April, 1893, he was Assistant Engineer of the Denver & Rio Grande R. R., and the following two years he was Chief Engineer of the Florence & Cripple Creek R. R., resigning that position in April, 1895, to become State Engineer of Colorado for two years. After leaving the office of State Engineer he became Chief Engineer of the El Paso & Northeastern, the El Paso & Rock Island Ry., the Alamogordo & Sacramento Mountain R. R., and the Dawson Ry., constituting the El Paso-Rock Island Route, until August of this year, when he was appointed Chief Engineer of the Denver, Northwestern & Pacific, Senator Clark's new road now building.

—Mr. Warren B. Kniskern, who has been General Passenger and Ticket Agent of the Chicago & North Western since 1895, has been advanced to Passenger Traffic Manager of the system, which position has just been created by the North Western. Born at Carlisle, N. Y., in 1851, Mr. Kniskern began his railroad career at the age of 18 with the Illinois Central as messenger, advancing through various positions to clerk in the general passenger department of the road. From 1873 to 1875 he was in the service of the North Western in charge of foreign reports in the general ticket office. He left this position to become Chief Ticket Clerk of the New Orleans, Jackson & Northern at New Orleans, La., and shortly after entered the general passenger department of the Louisville & Nashville, remaining until 1878, when he was appointed City Ticket Agent at Lousville, and later was given a similar position at New Orleans. He was in these two positions from 1878 to 1885, with the exception of six months in 1883, during which he was City Ticket Agent of the Chicago, St. Louis & Pittsburgh at Chicago. Returning to the Chicago & North Western in 1885, for 10 years, to Jan. 1, 1895, he was Assistant General Passenger and Ticket Agent, and on the latter date was



made General Passenger and Ticket Agent of the same road. His new appointment became effective August 21.

—Mr. Augustus Torrey, Chief Engineer of the Michigan Central Railroad, was killed on Tuesday, August 19. He was going over the line on an inspection car, and in rounding a sharp curve, the car was run down by a fast freight train. Mr. Torrey, Mr. A. G. Dailey, Superintendent of Track, and Mr. Ranson, a clerk, who were on the car, jumped, but Mr. Torrey received injuries from which he died. He was born at Beverly, Mass., Nov. 21, 1850, and entered railroad service in 1874. He was a Division Engineer on the Burlington & Lamoille Railroad to 1876; Superintendent of Water Works, Burlington, Vt., to 1880; Assistant Engineer Michigan Central to 1892; Acting Chief Engineer to Jan. 1, 1894; Chief Engineer from that date until his death. Mr. Torrey was a fine specimen of the best class of American railroad officers. He was able, resolute, honest, most devoted to his work, a master of his profession in general and in detail, and yet a man of genuine and unaffected modesty. With all his knowledge and with all the strength of his opinions, he welcomed information and sound thought from every source. He was not only a man of action and an administrator, but he was a student and was an investigator by nature. He was one of the originators of the American Railway Engineering & Maintenance of Way Association, and has been an officer of that Association from its beginning. It would be quite impracticable to attempt to state, in any detail, the results of his work for 28 years. Some of it the readers of the *Railroad Gazette* have seen from time to time in our pages, and some of it appears in various published proceedings of societies; but he was not a ready writer or a fluent speaker, and only wrote and spoke when he felt it important to say something. Consequently, his monument must be the work that he has done and the memory of respect and affection which he leaves with those who knew him well.

ELECTIONS AND APPOINTMENTS.

Algoma Central.—Wm. Apps, formerly Master Car Builder of the Canadian Pacific, has been appointed Master Car Builder of the Algoma Central, succeeding H. M. Perry, resigned. Effective Sept. 1.

Atchison, Topeka & Santa Fe.—Alfred Lovell, Superintendent of Motive Power, Northern Pacific, has been appointed Assistant Superintendent of Motive Power, A., T. & S. F., with headquarters at Topeka, Kan., after Sept. 1. He succeeds Wm. A. Nettleton, resigned, as mentioned under "Personals."

Atlantic Coast Line.—W. H. Wright, formerly Superintendent of the Charleston & Savannah Ry., has been appointed Superintendent of the Second District of the A. C. L., Plant System Division, succeeding G. W. Haines, resigned. Jeff. D. Andrews, formerly Chief Clerk to Superintendent of Transportation W. J. Hazlow, has been made Train Master of the Second District, A. C. L., from Savannah to Jacksonville, and from Jesup to Folkston, with headquarters at Savannah, Ga. C. J. Youngblood has been appointed Master of Trains, First District, A. C. L., headquarters at Charleston, S. C. The territory and jurisdiction of Master of Trains R. A. McCraine has been limited in extent from Brunswick to Albany, including terminals at Brunswick, with headquarters at Waycross, Ga.

Canadian Pacific.—J. Manson, heretofore Superintendent at Winnipeg, is appointed Superintendent of Districts 8 and 9, which include the lines east and south of Toronto and Toronto terminals, succeeding A. Price, promoted.

Chicago & Alton.—Charles A. King has been appointed Assistant General Freight Agent at Chicago, succeeding Louis Faithorn, resigned.

Chicago, Rock Island & Pacific.—William Given, Trainmaster of the Des Moines & Fort Dodge Division, has been temporarily assigned to discharge the duties of Superintendent of the Iowa Division in place of W. H. Stillwell, resigned. Charles Brown has been appointed Trainmaster of the Des Moines & Fort Dodge Division, while Mr. Given acts as Superintendent.

S. C. Plummer, M. D., has been appointed Chief Surgeon, and George E. McCaughan, Claims Attorney, both with offices in Chicago.

Chicago, Rock Island & Texas.—H. Harris is Acting Auditor.

Cincinnati Northern.—W. F. Backus has assumed the duties of General Superintendent, with the title of Superintendent.

Delaware, Lackawanna & Western.—The company has made arrangements with the Bangor & Portland for an entrance into New England, and has appointed Nathaniel Duke, General New England Agent, with office at 210 Washington street, Boston. Mr. Duke was formerly representative of the Lehigh Valley at Boston.

El Paso—Rock Island Route.—Robert S. Summer has been appointed Chief Engineer of the El Paso & Northeastern, the El Paso & Rock Island Ry., Alamogordo & Sacramento Mountain, and the Dawson Ry., with headquarters at Alamogordo, N. Mex., succeeding H. A. Summer, resigned, as mentioned in another column.

Erie.—D. L. Wells, heretofore Traveling Freight Agent for the Erie Despatch, has been appointed District Freight Agent for the Chicago & Erie at Huntington, Ind.

Lake Shore & Michigan Southern.—H. S. Storrs has been appointed Assistant General Superintendent, with headquarters at Cleveland, Ohio. Appointment effective Aug. 21.

Lehigh Valley.—E. D. Oakes is appointed Traveling Passenger Agent, with office at 218 South Clark street, Chicago, Ill. He was formerly with the Wabash.

Mexican Ry.—George W. Ware, heretofore Assistant Purchasing Agent of the Interoceanic of Mexico at New York, has been appointed Buyer jointly for the Purchasing Department of the Mexican Railway Company and of the Interoceanic Ry. of Mexico, with office as heretofore, 27 Broadway, New York. Loftus J. Nunn has been appointed Terminal Superintendent at Vera Cruz for both companies.

Minnesota & International.—G. D. Ball has resigned and it is understood that the office will be abolished after Sept. 15.

New York Central & Hudson River.—W. O. Thompson, has been appointed General Inspector, Locomotive Department, with headquarters at Albany, N. Y. James H. Hustis, Superintendent of the Hudson River Division (West Shore R. R.), at Weehawken, N. J., has been appointed Superintendent of the Rome, Watertown & Ogdensburg Division, succeeding Mr. Moon, resigned. C. Christie, heretofore Trainmaster at Weehawken, succeeds Mr. Hustis as Superintendent. H. W. Gilbert has been appointed General Foreman, Frankford Foundry, succeeding O. E. Moulton, resigned.

New York, Chicago & St. Louis.—W. L. Gilmore is appointed Superintendent of Motive Power in place of John Mackenzie, resigned. Effective Sept. 1. Mr. Gilmore was formerly with the Lake Shore.

New York, New Haven & Hartford.—Fred. Lavis has been appointed Assistant Engineer on the grade crossing work in Fall River, Mass.

Northern Pacific.—J. C. Thompson has been appointed City Passenger Agent at Chicago, succeeding Geo. W. Hallock, resigned. (See Pacific Coast Steamship.)

Ocean Steamship Co.—W. H. Pleasants has been elected Vice-President and General Manager, with headquarters in New York, after Sept. 15. He will have control in all matters of traffic and operation.

Oregon & Southeastern.—A. B. Wood has been appointed Chief Engineer, with office at Cottage Grove, Ore.

Pacific Coast Steamship.—Geo. W. Hallock, heretofore City Passenger Agent at Chicago for the Northern Pacific, has been appointed General Agent at San Francisco for the Pacific Coast Steamship line.

Pittsburgh, Lisbon & Western.—The office of General Manager has been abolished, and the offices of Traffic Manager and Superintendent created. K. E. Baringer, formerly General Manager and Auditor, becomes Traffic Manager; R. W. Billingsley, Superintendent, and W. B. Johnson, Auditor.

Pittsburgh, Shawmut & Northern.—F. W. Eder has been appointed Car Accountant, with headquarters at St. Mary's, Pa. Reports of per diem, mileage and movement of cars will be sent to him.

Rutland.—Philip T. Lonergan has been appointed Superintendent of Motive Power and Rolling Stock, with office at Rutland, Vt., succeeding Geo. W. Kenney, resigned (see "Personal").

St. Louis & San Francisco.—The position of Superintendent of Maintenance is abolished. R. P. Collins is appointed Division Roadmaster at Jonesboro, succeeding John Tobin, resigned.

Skaneateles R. R.—Charles P. Hemenway, recently Trainmaster of the New York Central at Syracuse, is now General Superintendent of the Skaneateles Railroad and Skaneateles Lake Transportation Companies.

Southern.—The General Freight Department of the Southern, including the offices of E. A. Niel, General Freight Agent, and of Lincoln Green, Assistant General Freight Agent, and their respective clerical forces, will be transferred from Washington, D. C., to Atlanta, in September.

Tennessee Central.—F. M. Bisbee has resigned the position of Chief Engineer of the Tennessee Construction Co., which is building the Tennessee Central. He is now General Manager of the San Antonio Land & Water Co. at San Antonio, Texas.

Texas Short Line.—A. H. Coakley, of Grand Saline, Texas, has been elected Secretary and Treasurer of this road now building.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALABAMA GREAT SOUTHERN.—Laying of a second track between Birmingham and Irondale, Ala., six miles, is reported in progress. The grade will also be changed in several places between these points, and trains are to be run temporarily over the tracks of the Southern.

ALLEGHENY & WESTERN CONNECTING.—This company was chartered in Pennsylvania, Aug. 18, to build a steam railroad 14 miles long from a point on the Western Pennsylvania near Harmarville station to a point on the Pittsburgh & Western near Gibsonia station, Pa. W. E. Fohl, of Pittsburgh, Pa., is President.

ATCHISON, TOPEKA & SANTA FE.—Orders have been placed for a large quantity of frogs, switches, etc., to be used in building a new line six miles long in New Mexico, to Hebron and Willow Grove.

BIRMINGHAM & ATLANTA AIR LINE (SEABOARD AIR LINE).—An officer writes that preparations are being made by this company, which was incorporated in Alabama April 23 in the interest of the Seaboard Air Line, to build the projected line from Coal City, Ala., to Birmingham. The work is in charge of Major J. W. Bushnell, Engineer in charge of construction at Cedartown, Ga. For further particulars see our issue of Aug. 22, page 664, under the heading Seaboard Air Line.

BUFFALO, ROCHESTER & PITTSBURGH.—Expenditure of $10,000,000 to build the new line from Punxsutawney, Pa., south into coal fields in Indiana County is said to have been authorized, and surveyors sent out to locate additional branches into coal territory in the northeastern part of the State. Contract for the line from Punxsutawney to Indiana, Pa., was let last April to A. E. Patton. (April 11, p. 277.)

CALIFORNIA ROADS.—An organization has been formed in Santa Clara County, Cal., for the purpose of building a railroad from some point at or near Mountain View, to a connection with the Southern Pacific. Two or three routes have been surveyed but nothing further has yet been done. It is proposed to obtain rights of way and financial aid from towns along the line. Edwin S. Williams, of Cupertino, is President, and Geo. E. Hyde, Secretary.

A purchase of 65,000 acres of timber land in Plumas County, Cal., is reported to have been made by W. B. Walker, of Minneapolis. Surveying parties are now in the field laying out lines for a railroad to open up the tract.

CALIFORNIA ROADS (ELECTRIC).—Contract has been let to J. E. Woolley for an electric road to connect Suisun, Vacaville, Winters and Elmira, a distance of about 18 miles, in Solano County.

CENTRAL OF ALABAMA.—It is said that grading will begin in a few weeks on this line, projected from New Decatur to Jasper, Fla., a distance of about 60 miles. Final surveys are reported complete, and rights of way all secured except for a strip about seven miles long in Lawrence and Morgan Counties, Fla. D. W. Sperke and T. L. Baker, of Decatur, are interested. (April 4, p. 257.)

CHICAGO, BURLINGTON & QUINCY.—Work is reported in active progress on a cut-off 12 miles long from Oskaloosa, Iowa, to Tracey, and the company expects to have the new line in operation by the first of November. The new line does not shorten the distance materially between Des Moines and Burlington, but opens up considerable new country.

CONNELLSVILLE CENTRAL.—This company was chartered in Pennsylvania Aug. 22 to build a steam railroad about 12 miles long from a point on Salt Lick Run in Fayette County, Pa., to a point in the Borough of Brownsville. John H. Hillman, of Pittsburgh, Pa., is President.

COTTON GROWERS.—This company has been incorporated in Mississippi to build from Blackhawk, in Carroll County, northwest to Greenwood and Itta Bena, a total of about 28 miles. Work must begin within two years by the terms of the charter. H. G. Kitchell and Wm. A. Green, of Greenwood, are the incorporators.

DENVER, NORTHWESTERN & PACIFIC.—It is said that contracts for grading, etc., will be let next month, and that financial arrangements are progressing satisfactorily, although it has not yet been determined when the bonds will be issued. There will be a mortgage for $20,000,000, of which the Mercantile Trust Co. will be trustee. This is the projected Denver-Salt Lake City line, of which D. H. Moffat is President. (June 27, p. 520.)

DUMAS-MEDFORD.—It is stated that a railroad will be built between these points in Arkansas, a distance of 12 miles, through a flat country. Joseph Franklin, of Little Rock, Ark., may be addressed.

EPHRATA & LEBANON TRACTION.—A company is being organized at Lancaster, Pa., with the above title, to build an electric line between the points named, 20 miles. With the completion of the line there will be direct trolley communication between Lancaster and Lebanon. T. A. Wilson, of Lancaster, Pa., is President.

GRANADA & TUPELO.—This company has been incorporated in Mississippi to build between the points named, a distance of about 75 miles. D. F. Watson, of Oronoga, Mo.; D. W. Johnson, of Pittsboro, Miss., and others, are incorporators.

GRANITE.—Certificate of incorporation was granted this company in Missouri Aug. 19, to build a steam railroad three miles long lying wholly within Iron County, and running from a point on the west side of the present main line of the St. Louis, Iron Mountain & Southern, south to Middlebrook Station, to Graniteville. The incorporators are Adolph Lopez, of St. Louis, and others.

GREAT CENTRAL.—According to most recent advices, instructions have been given to carry the surveys of the Coos Bay line through to Salt Lake, and provisions for bonding are said to have been made. L. D. Kinney, of Portland, Ore., is Chief Engineer. (June 20, p. 485.)

GREAT FALLS & CANADA (GREAT NORTHERN).—According to most recent advices regarding this road, which runs from Great Falls, Mont., into Canada, and is to be changed to standard gage, track laying has been begun at both ends of the line, but about 25 miles of heavy cutting and filling must be done within six weeks, besides the erection of a number of bridges, before the line can be turned over to the operating department of the Great Northern, as agreed, by Oct. 1. The Great Falls & Canada was sold last year to the Great Northern and connects with the line of the Alberta Ry. & Coal Co. at Lethbridge, in the Province of Alberta. (July 4, p. 543.)

HAMILTON, GRIMSBY & BEAMSVILLE ELECTRIC.—It is said that the proposed extension from Vineland to St. Catharines, Ont., 12 miles, will be built at once. Increased powers were granted the company some time ago.

HORAM RUN.—Charter was granted this company, Aug. 18, to build from a point on the line of the Buffalo & Allegheny Valley Division of the Pennsylvania at or near Sherwood Station, to a point on the line of the Pittsburgh, Shawmut & Northern, near the junction of Horam Run with Mill Creek, all in the County of Jefferson, Pa., a distance of eight miles. H. H. North, of Bradford, Pa., is President.

HOUSTON, BEAUMONT & NEW ORLEANS.—Organization was effected at Houston, Texas, on Aug. 20, by the election of officers. This is a new Gould line recently chartered to build from Houston to Orange, Texas, with the ultimate intention of extending to New Orleans. George J. Gould is President, and Leroy Trice, First Vice-President and General Manager. Preliminary surveys are reported completed from Houston east to a point about five miles south of Sour Lake, Texas, a distance of about 60 miles. (May 16, p. 372.)

ILLINOIS CENTRAL.—It is currently reported that a new branch road will be built in Yazoo County, Miss., from Vaughan to Howard Station, 22 miles, and that work will begin shortly.

IOWA HEMATITE (ELECTRIC).—This company has filed amended articles of incorporation with the Secretary of State of Iowa, increasing the capital stock from $25,000 to $250,000, and it is the intention of the organizers to start work on the proposed line between Waukeon, Iowa, and Lansing. W. Ingram, of Waukeon, is President. The purpose of the line is said to be to reach iron mines in Allamakee County, Iowa. (June 13, p. 454.)

KANSAS CITY, MEXICO & ORIENT.—We are informed that the route of this new line has been located for a distance of 150 miles east from Port Stilwell, Mexico, and that the engineers employed on that end of the line are now near Fuerte. (May 30, p. 404.)

KEWANEE, CAMBRIDGE & GENESEO (ELECTRIC).—This company was licensed in Illinois Aug. 11, to build an electric line from Kewanee to Geneseo by way of Cambridge, Ill., a total distance of about 25 miles, all of which is within Henry County. The incorporators are Geo. A. Anthony, Theodore Boltenberge and others.

LAKE ERIE TERMINAL.—Charter was granted this company Aug. 15, to build from a point on Lake Erie at or near the mouth of Elk Creek to the Borough of Albion, Pa., a distance of 11 miles. Edwin S. Templeton, of Greenville, Pa., is President.

LOUISVILLE & NASHVILLE.—Work is reported on a double track which is being laid from the south end of Salt River bridge to Lebanon Junction, Ky., a distance of 10 miles. When this is completed, the entire stretch from Louisville to Lebanon Junction, 29 miles, will be double-tracked.

MARION & RYE VALLEY.—Work is reported begun on the Rye Valley extension of this line 41 miles long. The road is at present in operation between Marion, Va., where a connection is made with the Norfolk & Western to Currin Valley, 6½ miles, and carries freight only.

John S. Apperson, of Marion, Va., is Vice-President and General Manager.

Missouri, Kansas & Texas.—According to most recent reports, work is in rapid progress on the extension from Stevens to Guthrie, Okla. T. A majority of the grade is completed and track laying was begun the first part of the month. Considerable difficulty in securing labor has been experienced. (May 23, p. 386.)

Monongahela, Allegheny & Ohio.—This company was chartered at Pittsburgh Aug. 21, to build a road 100 yds. long, with a view to prevent the Wabash from reaching the South Side mill district of Pittsburgh, from which a large amount of local freight tonnage is expected. The new line traverses property belonging to the Henderson-Johnston Warehouse Co., lying between the Pittsburgh, Cleveland, Cincinnati & St. Louis, and a high cliff, on the south, and the line of the Pittsburgh & Lake Erie, on the north.

Montana R. R.—Surveys are reported completed for an extension from Harlowton, Mont., to Lewistown, 62 miles, and it is said that the grade does not exceed ⅞ of 1 per cent. at any place. Contracts are to be let soon. The Montana R. R. is now in operation between Lombard and Harlowton, a distance of 94 miles, connecting with the Northern Pacific at Lombard. Robert Rantoul, Helena, Mont., is General Manager, and F. T. Robertson is Chief Engineer.

Norfolk & Western.—An officer sends a brief statement of the work which is being done at the present time, as follows: 13,640 feet of wooden bridges are in process of being replaced by masonry and embankment or steel structures; 23 miles of second track is building; grade and line is being improved for nine miles in Ohio and five miles in Virginia; a division yard with shops is being arranged for at Portsmouth, Ohio; a tunnel at Arion, Ohio, 518 feet long, is being converted into an open cut; two double track tunnels, 1,000 ft. long, are being built at Eggleston, Va., to improve line, and tunnels for two tracks are being built at Montgomery 810 ft. long in improved line; extensive additions to Roanoke Yard are being arranged for; about 12 miles of passing sidings are building; a low grade line is building between Naugatuck and Kenova, W. Va.; a branch line about 10 miles long is building to coal mines above Welch, W. Va.; Speedwell Extension to ore mills, 10½ miles from Ivanhoe, Va., is being completed; passenger station is being built at Bristol, Va.-Tenn.; a commodious passenger station is being built at Farmville, Va.; improved coal and ashes handling plants are under contract for Crewe, Va., Roanoke, Va., and Bluefields, W. Va.

It is said that the new line to be built from Naugatuck, W. Va., to Kenova, down the Tug and Sandy rivers, will cost $2,000,000, and that it will be practically free from grade or curvature throughout the entire 65 miles. (June 13, p. 454.)

North Augusta Electric & Improvement.—It is said that on Sept. 1 this company will put in operation the electric line of the Augusta & Aiken Co., owned by it, which runs from Augusta, Ga., to Aiken, S. C., 23 miles. The total track, including sidings, is 26 miles, and is laid with 60-lb. rail.

Northeast Texas.—Charter for this company was filed at Austin, Texas, Aug. 13, with principal office at Redwater in Bowie County. It is proposed to build from Redwater, on the line of the Cotton Belt, to Casseta, in Cass County, seven miles south of Sulphur River, a distance of about 21 miles. G. Munz and J. J. King may be addressed at Redwater.

Northern Pacific.—It is said that the projected line from Vancouver, Wash., to Portland, Ore., will cross the Peninsula practically on the line surveyed by the old Portland & Puget Sound Co. One tunnel about 3,000 ft. long is involved. Favorable report was made last winter by a committee of directors for building a steel and stone bridge to cost $2,000,000 across the Columbia at Vancouver, in connection with this line, which has been completed down the north shore of the river from Kalama to Vancouver.

Oregon & Southeastern.—This company has completed 10 miles of line between Cottage Grove and Bed Rock, Ore., and is now building beyond that point, with a view to having eight miles more in operation by the first of November. W. F. Morphy, Cottage Grove, Ore., is General Manager, and A. B. Wood is Chief Engineer. The purpose of the company, as stated in its original articles of incorporation, is to develop mines, etc.

Paragould & Memphis.—This company has absorbed the Cardwell & Big Lake, a short line between Cardwell and the Arkansas State line, and will build from Paragould to Osceola, 52 miles. Contracts are to be let for building from Paragould to Manila, Ark., by way of Cardwell, Mo., before the first of January. J. E. Thomas, Cardwell, Mo., may be addressed.

Pennsylvania.—An officer denies current reports that the curves along the Conemaugh River in the Packsaddle are to be eliminated.

Philadelphia, Bristol & Trenton Passenger R. R.—It is reported that a syndicate has been formed in Baltimore, with the Union Trust Co. at its head, which has underwritten $600,000 bonds to pay for and complete the electric line from Torresdale to Bristol, Pa., and Trenton, a total of 22 miles, forming a link in the trolley connections between Philadelphia and New York.

Rapid Railway (Electric).—Work is reported resumed on the cut-off between Marine City and Anchorville, Mich., and is now in progress by a large force. The company is part of the Detroit, Port Huron & Shore Line, and operates 17 miles of electric line in Michigan.

St. Louis, Memphis & Southeastern.—An officer writes that an extension from Hoxie to Little Rock, Ark., is in contemplation, but the building of the proposed line will depend upon whether or not the present adopted grade of .2 of 1 per cent. can be continued, and also upon the interest shown by the communities which would be benefited. At present two engineering parties are in the field making the necessary investigations. Newman Erb is President. For map showing the location of the existing line in Arkansas, terminating at Hoxie, see our issue of July 4, page 544.

St. Louis, Mississippi & Alabama.—Incorporation has been granted this company in Mississippi to build from Eastport, in Tishomingo County, Miss., to Tuskaloosa in Tuskaloosa County, Ala., through the Counties of Tishomingo and Ittawamba in Mississippi. The route through Alabama is not stated, but the proposed line could not be less than 100 miles long. The incorporators are J. A. Pyle, F. T. Carmack and E. F. Carmerly, of Iuka, Miss.

San Francisco Railway & Ferry.—Articles of incorporation were filed by this company in California Aug. 14, with the intention of building electric lines running through Oakland, Alameda, Berkley, Haywards and San Leandro to San Jose, aggregating about 145 miles, if built as planned. The company has also obtained possession of more than 100 acres of water front property in Oakland. Tirey L. Ford, J. Dalzell Brown and others, of San Francisco, directors.

San Jose & Congress Springs (Electric).—Franchise to build this freight and passenger line between the points named, 17 miles distant, was granted at San Jose on Aug. 18 to L. A. Sage, owner of a hotel at Congress Springs, Cal. It is said that work will begin within 60 days. The route will tap a rich orchard district.

San Pedro, Los Angeles & Salt Lake.—Specifications are being prepared and contracts will be let at Los Angeles in a few days for building between Ontario and Riverside, Cal., 20 miles. Track laying, bridges, concrete work and ballasting will be done by the Empire Construction Co. Material is at hand for completing the line to Riverside, and it is estimated that the grading over the section now to be let will be completed within 90 days.

Southern.—Work is reported in progress replacing the 56-lb. rails on the Memphis Division with rails of 75 and 80 lbs., and it is said that by the close of the year about 25 per cent. of the work will have been completed. The intention of the company is to rebuild the line between Memphis and Chattanooga so that fast time may be made between Memphis and New York.

Work is reported in progress on a branch from a point near Old Fork, N. C., towards Yancey County, about 10 miles.

Southern Missouri.—Grading is now practically completed on this new line from Little Rock Landing to Bismarck, Mo., and rails are being laid through Ste. Genevieve County. McArthur Bros., of Chicago, are the contractors, and Robert Moore, of St. Louis, is Chief Engineer.

Tennessee & North Carolina.—At the present time 23 miles of this projected road is in operation from Newport, Tenn., to a point beyond Waterville, N. C., and rails are now being laid on a stretch of three miles. It is planned to extend to Waynesville, N. C., 30 miles beyond, where connection will be made with the Southern. Waynesville is about 25 miles south of Ashville. F. F. Holloway, of Wheeling, W. Va., is President and General Manager. (April 11, p. 278.)

Tennessee Roads.—It is said that the New River Coal Co. will build a road 17 miles long from a point on the Cincinnati Southern, to timber and mineral lands owned by them in Scott County, Tenn.

Texas Short Line.—Work is reported completed on the 10-mile stretch from Grand Saline to Hoyt, Texas. It is proposed to extend the line northeast and also southwest from its present terminals, the total extensions contemplated at present amounting to about 100 miles. Henry M. Strong, of Grand Saline, is President, and R. S. Weitzell, of Weatherford, Texas, is Chief Engineer.

Virginia Roads.—It is said that a narrow gage line 25 miles long will be built by Miller & Miller, of Richmond, from a connection with the Southern into timber lands owned by them, in Lunenburg County.

Western Maryland.—An inspection of the line is now being made under the direction of Virgil G. Bogue, after which it is proposed to straighten the line and reduce grades, with a view to establishing a low grade road.

Western of Alabama.—An officer sends the following information about this projected line in Alabama: The route will be from Soapstone bridge in Dallas County, on the south side of the Alabama River, to Selma, a distance of 8½ miles. It is intended to abandon the present bridge across the Alabama River about a mile from Soapstone bridge and connect with the Louisville & Nashville about 7,500 ft. from the river at Selma, using the bridge and new passenger station now being built. The line is located and will be built as soon as the preliminary engineering work is completed. Contracts for grading, track laying, etc., will be let at once. The work will be light, with .05 per cent. maximum grade, and with one 2 deg. and two 1 deg. curves. One trestle about 200 ft. long will be necessary. J. W. Gannon, C. E., Montgomery, Ala., is the engineer in charge.

West Virginia Central & Pittsburgh.—Work is reported in progress on several new spur lines in West Virginia to reach coal mines in the vicinity of Chaffee and elsewhere.

Willows-Butte City (Electric).—Rights of way have been secured, provisional contracts made and arrangements completed with ranchers for labor on a new electric line 10 miles long between these points in California. Power will be furnished by the Northern California Power Co. of Redding.

GENERAL RAILROAD NEWS.

Baltimore & Potomac.—At a special meeting of the stockholders Aug. 21, a resolution to merge the company with the Philadelphia, Wilmington & Baltimore was unanimously adopted. The details provide for the organization of the Philadelphia, Baltimore & Washington company, with a capital stock to consist of 507,009 shares of $50 par value, amounting in the aggregate to $25,350,450, which will be owned almost entirely by the Pennsylvania and the Northern Central Co. The new company will also cover the bonded debt of the two companies absorbed, amounting to about $12,500,000. The Baltimore & Potomac is now operated under contract by the Philadelphia, Wilmington & Baltimore, and runs from Baltimore to Polk's Creek, Md., 73 miles, with branches which bring the total mileage to 93.

Brunswick & Birmingham.—Announcement is made that this line, now in operation between Brunswick and Thalmann, 19 miles, connecting with the Seaboard Air Line at the latter named place, has secured the Ellis Young dock property in Brunswick, which is one of the most valuable fronts on the bay. The original purpose of the Brunswick & Birmingham was to build a through line between the points named, a distance of about 450 miles, but no work has been done of any importance since the line to Thalmann was completed. R. C. Machen, of Brunswick, is President.

Canadian Pacific.—Arrangements are said to have been made with the Windsor Salt Works by which the above railroad has secured 150 ft. of frontage on the Detroit River adjoining its present yards in connection with the salt company. The two companies together, it is said, will build docks, deepen the river, erect warehouses and otherwise improve the shipping facilities by both water and rail.

Chicago & Southeastern.—Acting on published reports that this line had been sold by its former President, it was seized on Aug. 24 by Benjamin Simpson, Receiver, and is now being operated by him. The officers have made no effort to regain possession. The Chicago & Southeastern was organized in 1891 as successor to the Midland Ry. Co., and the tracks of the Vandalia are used from Brown Valley to Sand Creek, Ind., 12 miles. The total mileage operated is 127.

Illinois Central.—At the annual meeting of the stockholders on Oct. 15 the proposition to purchase the property, corporate rights and franchises of the following companies, now leased or operated, will be submitted: The Chicago, Madison & Northern, Kankakee & Southwestern; Chicago & Springfield, Mound City, St. Louis, Alton & Terre Haute, Chicago & Texas, Chicago, Havana & Western, Rantoul, Illinois & Indiana, and the Riverside & Harlem railroads.

Interborough Rapid Transit (New York).—August Belmont & Co. announce to the holders of certificates of deposits of stock of the Rapid Transit Subway Construction Co., and certificates of subscription for stock of the Rapid Transit Subway Operating Co., that the voting trust certificates representing stock of the Interborough Rapid Transit Co., are now ready for delivery, and holders of the above named certificates are asked to present them at the company's office in New York in exchange for the new voting trust certificates. In accordance with the agreement of Dec. 16, 1901, owners of certificates of deposit of stock of Rapid Transit Subway Construction Co. will receive 160 per cent. in full paid voting trust certificates for each share of stock deposited. Holders of certificates of subscription stock of Rapid Transit Subway Operating Co. will receive new certificates representing the stock subscribed for, with the 40 per cent. already paid in indorsed upon them. The Interborough Co. has purchased other franchises as well, for the account of which see our issue of June 6, page 422.

International & Great Northern.—The Texas Railroad Commission on Aug. 18 ordered registered $280,000 of bonds on the 14 miles of the Fort Worth Division north of Waco, Texas.

Knoxville, Sevierville & Kimberlin Heights Electric.—A mortgage to the Central Trust Co., trustee, has been filed to secure $1,000,000 of bonds, and the capital stock was increased on June 6 from $10,000 to $1,000,000. Charter was granted the company in November, 1901, to build 54 miles of line, of which 40 miles will be the main line, with 14 miles of branches, and work was begun the last week in June on surveys. The chief promoter of the enterprise is W. T. Goffe, of Montreal. E. N. Harris, of Knoxville, Tenn., is Chief Engineer.

Lake Shore Electric.—Further details of the plan of reorganization reported in our issue of Aug. 15, page 650, indicate that a first consolidated mortgage of $4,000,000, and a new second general consolidated mortgage of $6,000,000 will be provided for. The first consolidated mortgage is a first mortgage on 80 miles of track, including the Sandusky & Interurban, Sandusky, Norwalk & Lorain, and Sandusky & Lorain lines, and a second mortgage on the Lorain & Cleveland and the Toledo, Fremont & Norwalk, aggregating 90 miles of track. Of this issue, $2,250,000 will be held in escrow to take up outstanding bonds, and $1,750,000 will be taken by a syndicate of Cleveland bankers at 90 and interest, the proceeds to retire Sandusky & Interurban bonds, receivers' certificates, Sandusky & Interurban notes and other floating indebtedness, and will leave about $200,000 cash in the treasury after clearing up all of the indebtedness of the road except $1,100,000 Lake Shore bonds now outstanding. Of the new second general consolidated mortgage, $4,000,000 is to be placed in escrow to retire the $4,000,000 first consolidated bonds; $1,050,000 is to be exchanged bond for bond for the Lake Shore Electric bonds, and $950,000 held in the treasury for future uses.

Missouri, Kansas & Texas.—Statement of gross and net earnings for the month of June, 1902, shows a decrease in gross of $28,763, and an increase in operating expenses and taxes of $10,423 during the same period, resulting in a net decrease of $39,186. For the 12 months ending June 30, 1902, however, gross earnings increased from $15,403,083 the year previous, to $16,391,400, and after deducting operating expenses and taxes, net earnings remained of $4,519,835, an increase of $250,898 over the figure for the 12 months ending June 30, 1901.

New York & Ottawa.—This line, which runs from Tupper Lake to the St. Lawrence River, N. Y., 68 miles, and operates a total of 74 miles of track, has been ordered sold by Judge Coxe, of the United States Circuit Court, under mortgage foreclosure proceedings brought by the Morton Trust Co. of New York. Chas. G. Irish, of Utica, has been appointed special master and will conduct the sale at St. Regis, Franklin County, some time in November. He is directed by the decree to receive no bid of less than $1,000,000. The road was opened in 1898, and has been rolling up an increasing deficit ever since that time. It is in the hands of a receiver, and suit to foreclose the bonds was begun in June, 1900. The decree recently filed states that the indebtedness of the road is $2,085,327. The rolling stock owned consists of eight locomotives, nine passenger coaches, and freight cars, etc., bringing the total number of cars to 265.

Philadelphia, Wilmington & Baltimore.—See Baltimore & Potomac.

Union Route.—A new freight route from Pittsburgh to the Northwest is reported arranged by conference between the Bessemer & Lake Erie, Pere Marquette and Lake Erie & Detroit River Co. The new route runs from Pittsburgh to Conneaut, Ohio; over the Bessemer & Lake Erie from Conneaut, across Lake Erie by the Bessemer car ferries to Rondeau; thence by the Lake Erie & Detroit River to Port Huron, and over the Pere Marquette into Michigan.

White River Valley.—This line, which runs from Rochester, Vt., to a connection with the Central Vermont at Bethel, 16 miles, and operates a total mileage of 19, was sold by Rufus H. Sawyer, Receiver, at Bethel, Aug. 20, the purchaser being Judge Waterman of Brattleboro, Vt., who secured the road for Samuel Williams and Ernest Jose, of Boston, and James A. Tyler, of Gardner, Mass. The purchase price was $55,000. The road was chartered in 1896 and built in 1900, but was at once placed in the hands of receivers pending the trial of a suit in the United States Court. The cost of the road was about $300,000. The American Loan & Trust Co., of Boston, Mass., were the trustees of the bonds.